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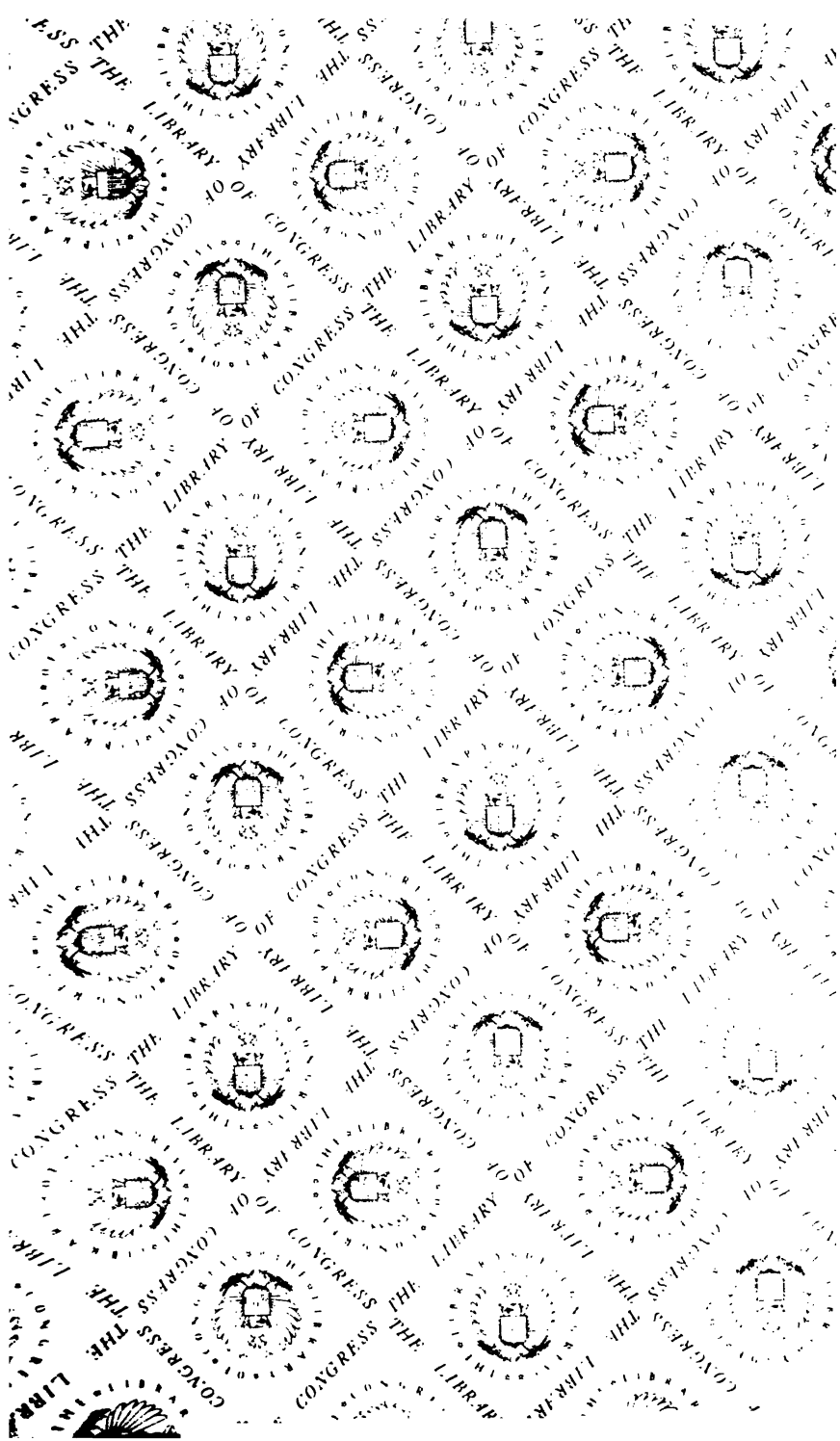
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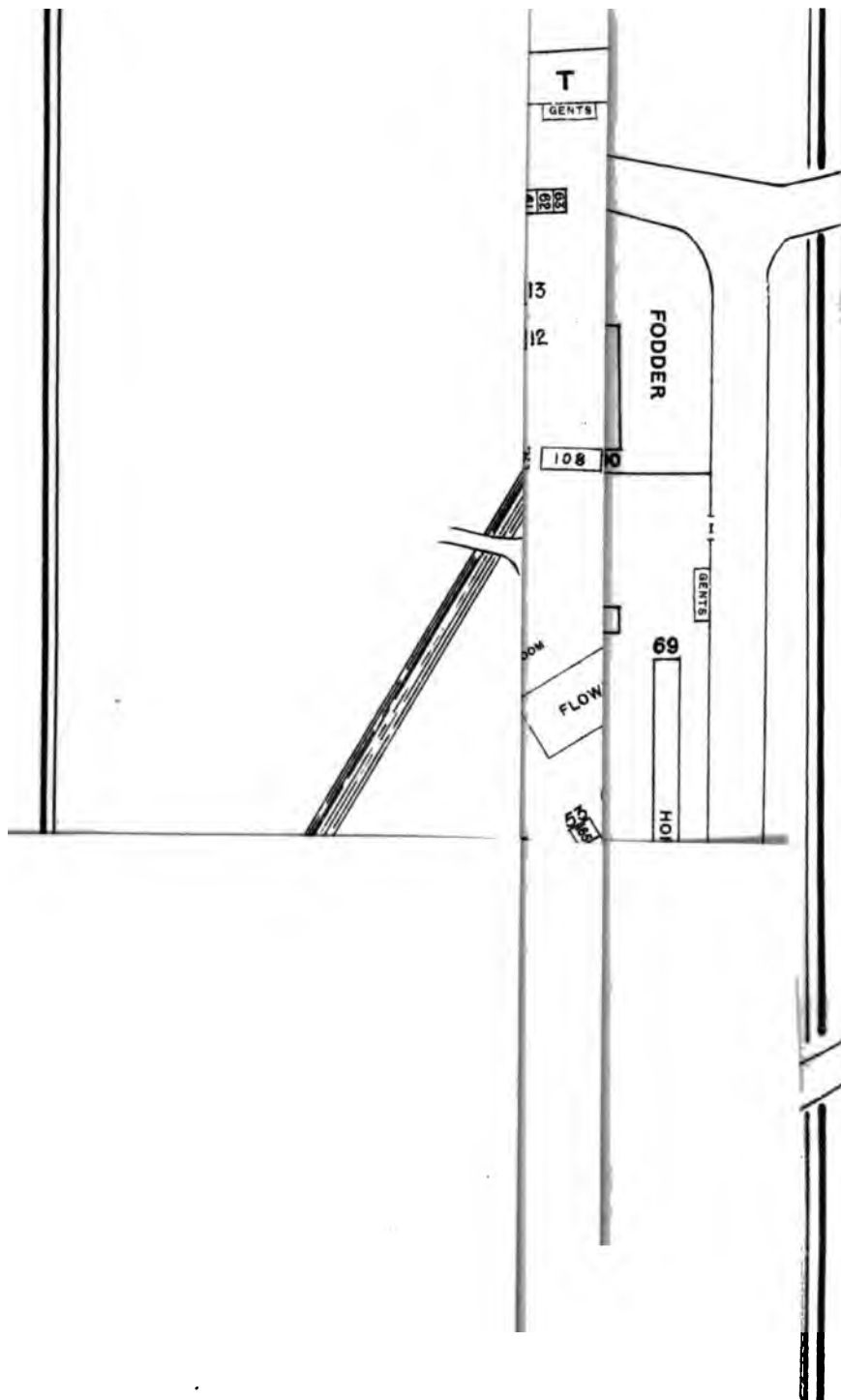
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JOURNAL
OF THE
EAST AND WEST AND SOUTHERN
COUNTIES SOCIETY.

FOURTH SERIES.

VOL. IX.

1898-99.

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**WORK AND LEARN.**  
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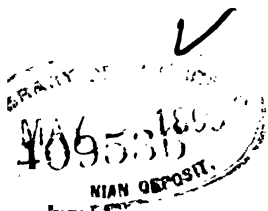
LONDON:
EDWARD STANFORD, 26 & 27, COCKSPUR STREET,
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52
123

"He that goes about to forward agricultural improvement must begin by finding out the true reasons of what is called routine, or the 'custom of the country.' It sometimes happens that these reasons are only accidental, and then you may dismiss them fearlessly; but often it turns out that every-day practice rests on a solid foundation of facts; and then if you make an onslaught on local prejudices, they will be sure to beat you."

"The true course for the agricultural improver is, to take one step at a time, to gain a clear insight into facts by experience, not to try to go too fast, and to trust to the work of time."

"If practice which sets up to do without theory is contemptible, theory without practice is foolhardy and perfectly useless."—*From the Rural Economy of England, Scotland, and Ireland*, by LEONCE DE LAVERGNE.

CONTENTS.

VOLUME IX.—FOURTH SERIES. 1898-9.

In Memoriam.

	PAGE
The Right Hon. Sir Thomas Dyke Acland, Bart.	1
By Thos. F. Plowman, Secretary and Editor.	

ORIGINAL ARTICLES AND REPORTS.

I. Sheep-Scab	25
By Professor Wortley Axe.	
II. Farm Seeds: their Quality and Examination	44
By Professor John Percival, M.A., F.L.S., South- Eastern Agricultural College, Wye.	
III. The Advantages of Co-operation and Combination among Agri- culturists for Purposes other than mere Exhibition	77
By R. Henry Rew.	
IV. The Farm Schools of Normandy and Brittany	88
By Granville E. Lloyd-Baker.	
V. The Evolution of Farm Implements and Machinery in the Past Sixty Years	95
By Joseph Darby.	
VI. Dairying in Cornwall	117
By James McCreath, F.H.A.S., F.C.S.	
VII. The Plant Foes of the Farmer	128
By William Carruthers, F.R.S., F.L.S., &c.	
VIII. The Society's Dairy and Farriery Schools	136
By Thos. F. Plowman, Secretary and Editor.	

	PAGE
IX. Observations on Cheddar Cheese-Making. Report for 1898 ..	142
By F. J. Lloyd, F.C.S.	
X. The Society's Experiments for the Improvement of Permanent Pasture	174
By Francis J. Rowbotham.	
XI. The Society's 1898 Exhibition of Cider	190
By F. G. Farwell, Steward.	
XII. Investigations into the Manufacture of Cider. Report for 1898 ..	203
By F. J. Lloyd, F.C.S.	
XIII. Annual Report of the Society's Consulting Chemist (Dr. J. A. Voelker, M.A., F.I.C., &c.)	216
XIV. The Society's Exhibition at Cardiff	217
By Thos. F. Plowman, Secretary and Editor.	
XV. The Milk and Butter Test Cattle Classes at the Cardiff Exhibition	222
By Dr. J. A. Voelker, M.A., F.C.S., Mr. Ernest Mathews, and Mr. Julian Stephens.	

THE NOTE-BOOK.

The Duck Industry	229
Sterilised Milk	231
Good and Bad Points of Sheep	234
Poor v. Rich Land	237
Lucerne (<i>Medicago sativa</i>)	239
Systems of Farming	241
Acidity of Cream	242
The Destruction of Charlock in Field Crops by Spraying with Solution of Sulphate of Copper	243
Air Space in Cow Stalls	244
The Manuring of Oats	247

THE FARMER'S LIBRARY.

1. Technical Mycology	251
2. Food Supply	252
3. The Rational Feeding of Live Stock	253

CONTENTS.

v

	PAGE
4. Handbook of Insects injurious to Orchard and Bush Fruits	254
5. Jersey Cattle: their Feeding and Management	255
6. The Story of the Farm	256
7. The Manuring of Market Garden Crops	257
8. The Great Horse. The Harness Horse. Young Race Horses	258
9. The Adulteration of Dairy Produce	259

APPENDIX.

CARDIFF MEETING, 1898.

Judges	i
Awards	iii
Art Union Prizes	lxiv

PRIVILEGES, LAWS, OFFICERS, &c.

Objects of the Society and Privileges of Membership	lxvi
Terms of Membership	lxvii
General Laws	lxviii
Council and Officers	lxxi

List of Annual Exhibitions, 1852-98	lxxvii
Botanical Privileges	lxxix
Chemical	lxxx

EXETER MEETING, 1899.

Prizes for Stock, Dairy Produce, &c.	lxxxiv
Conditions and Regulations for ditto	xcix
Prizes for Poultry	cviii
Conditions and Regulations for ditto	cx

FINANCE.

Summary of the Cash Account to December 31 1898	..	..	cxiv, c
Detailed Cash Account	..	..	cxvi-cx
Assets and Liabilities Account	cxix

List of Members on January 31, 1899	cxj
-------------------------------------	----	----	-----

INDEX	c
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THE LATE RIGHT HONOURABLE SIR THOMAS DYKE ACLAND, BA

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JOURNAL
OF THE
BATH AND WEST AND SOUTHERN COUNTIES
SOCIETY.

In Memoriam.

The Right Hon. Sir Thomas Dyke Acland, Bart.
By THOS. F. PLOWMAN, Secretary and Editor.

SINCE the last issue of the 'Journal' a great link with Society's past has been severed,* and a great personality in West has passed away.

So inseparably associated was the late Sir Thomas Acland with this Society, so often was he its representative spokesman that, in the plenitude of his powers, he was to many its living embodiment. Truly he may be said to have stood towards *in loco parentis*, for when its life was ebbing away his very energy imparted to it the power to arise and put on strength.

Whilst his services to the Society were manifold, he was especially and intimately identified with that section of work represented by the 'Journal,' that this volume could hardly have appeared without some special tribute, however inadequate, to his memory. Those most capable of giving expression to this feeling urged reasons against their doing which were entitled to be accepted as conclusive; hence I taking upon myself of this responsibility. Whilst it has been a labour of love, very willingly discharged, I am not the less mindful of my own inability to do justice to it. But, where ever possible, the subject of this memoir shall, through

* "Oh, there are voices of the past,
Links of a broken chain;
Wings that can bear us back to times
Which cannot come again.
Yet God forbid that we should lose
The echoes that remain!"—ADELAIDE A. PRECTER.

writings, speak for himself, and this, conjointly with his recorded actions, will best show "what manner of man he was," and how great is the sum of the Society's indebtedness to him.

Now that we are almost on the threshold of a new century, it seems a far cry to the days of the early fifties, when the foundations of an inextinguishable debt of gratitude were laid. It would be difficult now to find anyone who, from personal knowledge, could particularise the circumstances under which Sir Thomas did so much to shape the future destiny of the Society, for he outlived nearly all those who then gathered round him in response to his call. There is, however, sufficient documentary evidence to tell the story of that crisis in the Society's history when there came "a tide" in its affairs "which, taken at the flood," led "on to fortune."

Previous to his connection with the Society, Sir Thomas had given some proof of his interest in Agriculture. When, after supporting the repeal of the Corn Laws, he retired, in 1847, from parliamentary life for a time, an old friend said to him, "Whatever you do, don't go to sleep." He took the hint by at once diligently applying himself to the systematic study of agricultural questions, and followed this up by successfully competing for a premium offered by the Royal Agricultural Society of England for a Report upon the Farming of Somerset.

This Report, which was published in 1850 in the above-named Society's Journal, is an admirable epitome of the agricultural features and practice of the county at that time, and it is evident that he spared no pains to make it as thorough and complete as possible. He obtained information at first-hand by travelling about the county and personally interviewing many practical agriculturists and leading breeders; the experiences thus collected, with the addition of many shrewd observations of his own, adding a lasting interest and value to his Report.

His name, in company with that of his friend, Mr. Pusey, was on the back of the first tenant-right Bill; and his interest in this question, long before there was any legislation upon it, is indicated by the following extract from the above-mentioned Report:—

"The farms of the West of England are generally of a moderate size, and nothing would be gained by a change in this respect, provided only, the tenants were generally placed in such circumstances that they might venture to make a judicious expenditure.

"The first thing is to remove obstacles to the outlay of capital. A thorough reform in the covenants inserted in leases and agreements is required. In such documents the advice of a practical agriculturist, who understands the climate and habits of the country, but whose judgment has been ripened by extended experience of other districts, is more needed than the common forms of the lawyer. Covenants founded on a dread of exhausting the

herent energies of the soil are out of date. The less a man of capital and integrity is restricted in his mode of cropping the better. Couch soon tells tales. . . . Security for the outlay of capital is essential to profitable farming in the present day. It may not be proper to discuss here the means by which the security may best be given. Let it only be remembered that no man can now farm well unless he can look with confidence beyond next Michaelmas. Among good farmers a feeling is now universal, which cannot be better expressed than in the following words of a tenant, who is himself very comfortably situated: 'What we want is any arrangement which will enable us to farm in such a manner that we can give up an estate in good condition without injustice to ourselves or our families.'

In the year 1850, the Royal Agricultural Society of England held its Annual Meeting at Exeter, and its success brought forcibly home to Sir Thomas (then Mr.) Acland the advantages of such an exhibition to the agricultural community in whose midst it was held. "It was," said he, "a great matter for us in the West to have Garrett and Hornsby and Busby and Crosskill brought from Suffolk, Lincolnshire, and Yorkshire to our very doors, but when shall we see them again?"

He could not rest, therefore, until he had made an effort to bring these advantages within more frequent reach of his beloved West, and in that spirit of enthusiasm which, when once his own mind had been convinced, it was not easy to quench, he set to work to stir up others to action. He first obtained a sympathetic hearing at a meeting of Somerset Magistrates at Quarter Sessions, when the then Lord Lieutenant of the County (Lord Portman) suggested that the matter should be laid before the Bath and West Society, of which he was at that time President.

After fifty years of activity, during which it had earned for itself a title to be considered one of the pioneers of agricultural progress, the Society had begun to "dwindle, peak, and pine," and in the forties it had dropped to the level of a local association limited in sphere and influence, with a prospective tendency to fade gradually out of existence.

Sir Thomas, seeing the possibilities opened up by Lord Portman's suggestion, straightway formulated a scheme which was first promulgated by means of a letter to Mr. (afterwards Sir William) Miles, who, besides representing the Eastern Division of Somerset in Parliament, was also Vice-President of the Bath and West Society. The arguments in favour of the scheme were set forth in this letter with force and directness. No point was shirked—Sir Thomas knew exactly what he wanted, and the most likely means of obtaining it.

Prior to this time, the Annual Exhibitions of the Bath Society had never been held outside the City of Bath, but he saw that the Society must be migratory if interest in it was to be fully

maintained, and if its benefits were to be adequately diffused. He enforced this principle in his letter, when he said:—

“I think we require the continued action of a Society holding its meetings in successive years at different places in the West; possessed of a sufficient income to give prizes for implements as well as for stock, and to distribute to its members printed transactions containing digested reports of careful experiments; in short, to carry into every corner between Dundry Hill and Dunkerry Beacon—and further West, too, I hope, if we can all pull together—the results attainable by Practice with Science.”

* * * * *

“I expect to be met at the outset with the enquiry, ‘Have we not Societies enough already? What can we want of more? Do you want to offend or to absorb all the local Societies?’”

Sir Thomas, in answer to this, pointed out in terms which are equally applicable to-day the distinction which should exist in their aims and objects between purely local Societies and those corresponding to that which he hoped to see established.

At the Annual Meeting of the Bath and West Society held at the Guildhall, Bath, on December 3rd, 1850, under the presidency of Lord Portman, Mr. Acland was elected a member of the Society in order to enable him to bring his proposal under notice. He was then in a position to state that, although his scheme had not been published more than a week, he had already received nearly one hundred letters with reference to it, two-thirds of which were favourable; a striking testimony alike to the value of the scheme and to the personal influence of its promoter.

The proposal was cordially approved by the meeting, among those speaking in its favour being Lord Portman, Mr. Miles, Captain Scobell, the Rev. J. Horner, and Mr. B. Gray. A committee was appointed to go into details, the honorary secretaries of which were Mr. Acland, Sir Stafford Northcote (afterwards Lord Iddesleigh), and Mr. H. St. J. Maule, with the subsequent addition of Mr. R. Dymond, of Exeter. All the speakers, as well as the secretaries, have since gone to their rest, but it is pleasant to know, for it gives evidence of a continuity of interest, that every one of their surnames appears in the last printed list of members of the Society, and in nearly every case represents a direct descendant.

Sir Thomas threw himself into the cause he had at heart with all the ardour, which was not a little, at his command. He was convinced that there was “life in the old dog (*i.e.* the Bath Society) yet,” but that a more extended range and some feeding up were required to put him upon his legs again. Meetings for the purpose of ascertaining the feeling of agri-

culturists with regard to the scheme were held in various western towns, and at all of them resolutions supporting it were adopted. Finally, the Devon Agricultural Association cast in its lot with the Bath Society, and a fusion of the two bodies was effected. The Society, upon the Report of the Committee previously referred to, formally adopted the scheme on April 8th, 1851.

The scheme provided for the holding of the annual exhibition in different localities in successive years, and the first show, under this arrangement, took place at Taunton in 1852. The opening meeting, at which there were 238 stock and 400 implement exhibits, was regarded as a great success. Yet, when the Society next visited Taunton in 1870, the stock and kindred exhibits totalled up to 908, and the implements, too numerous to count, were reckoned by thousands, and occupied 9,200 feet run of ground. The following visit in 1895 showed still more remarkable progress, for the stock and kindred entries had increased to 2,115, and the implement section required 25,477 feet run of space. Thus has time borne testimony to the far-sightedness of the originator of "the great revival," as it has been appropriately termed. Sir Thomas Acland's father presided at the meeting in the following year at Plymouth.

Thus freshly constituted, the Society obtained a new lease of life, its future was established on a solid basis, and its scope of usefulness was enlarged to an extent undreamt of by those to whom its foster-father had first appealed for aid. Twenty years afterwards, Sir Thomas, in pursuance of the same principle, threw all the weight of his influence in support of a further extension of the Society's area of operations, for he was an active promoter of the scheme under which the Southern Counties Association became amalgamated with the Bath and West Society, whereby an agricultural union was established between the West and South.

But the programme Sir Thomas had in his mind was by no means limited to the holding of a big annual show. In his letter to Sir W. Miles, he foreshadows something more than this in words, which, as they strike the key-note of so much of his action, may be quoted. He says:—

"Another means of improvement is by encouraging men of good education, of whom I trust the number is daily increasing (though we are sadly in want of good schools) to improve their own habits of observation by making careful statements of experiments made under their own eyes, or by collecting the experience of others. I am not going to advocate book-farming, for I have learned much more from jogging along the road with some shrewd old farmer who has been kind enough to let me tease him with all sorts of questions about what he has seen and observed himself, than I could ever gain from treatises on farming."

It was his appreciation, as shown in the foregoing remarks, of the practical side of agriculture that secured for much that he had to say consideration from those who were not always keen to acquire knowledge outside that which their own experience or that of their fathers supplied. They were, however, less unwilling to listen to one who did not undervalue the lessons derived from such experience.

At an early period of the Society's existence, Arthur Young, who interested himself in its work, wrote to the Committee: "By all means publish your transactions; what you do is not for your own district alone, but for a much larger sphere. A Society that does not publish its transactions may be of a partial, limited, and confined utility, but can never diffuse the knowledge it rewards, nor render the successful efforts the means of general improvement."

The Society took this advice to heart, and shortly after its foundation in 1777 began to publish its transactions under the title of "Letters and Papers on Agricultural Planting, &c., selected from the Correspondence-Book of the Society." These appeared at intervals up to 1829, when their publication ceased.

The revival of some such medium for disseminating particulars of the Society's work as well as for recording agricultural experiences generally, was an element in Sir Thomas's scheme, to which he attached no little importance. So in 1853, at his initiation and under his editorship, there appeared the first volume of what was described as the 'Journal' of the Society. It contained, in addition to reports of the Society's doings, list of prize awards, &c., several original articles, reviews of agricultural publications, and a section known as "The Farmer's Note Book." Sir Thomas was no novice at editorial work, for he had been personally associated with a very dear friend and colleague, Philip Pusey, in the editing of the *Journal of the Royal Agricultural Society of England*.

The aim of the new publication was well-expressed in an introductory notice by its founder and Editor, in which he said:—

"We may endeavour (with the aid of practical men) to cull from the farming of all England such points of practice as seem likely to make any improvement on our own, and to be really suited to our soils and climate; and while we cannot hope (nor, indeed, would our 'Journal' be the place for the attempt) to widen the domain of science by the discovery of new truths, we may render service by giving a popular account of such principles as are clearly ascertained by experiment to be true, and by showing how they may be practically applied to our wants and circumstances. In short, 'local practice' and 'applied science' may, in some degree, express the department assigned to us."

After referring in detail to the special subjects with which, it was thought, the 'Journal' might be able to deal, a hope was expressed that it might—

"render some little service by opening a medium of communication between agriculturists, and by suggesting enquiry, as well as collecting information, on many unsettled points of practical detail. There are many principles clearly apprehended by the mind which lie dormant because we have not yet learned how to apply them, there are many points on which practical men hold the most opposite opinions, and on which no one can decide for want of accurate data."

The objects thus set forth have since been steadily kept in view, and if time has justified Sir Thomas's belief in the possibility of establishing and supporting such a publication, if the interest in it has been maintained, and its utility has been admitted, it may be said to be mainly due to him, who shaped its course in the first instance and watched and tended it with loving care for so long a period afterwards. Since the day of its inception, it has been annually issued without a break, and, in all essential particulars, it retains the form designed for it by its first Editor—another testimony to his perspicacity and acumen.

For seven years after he had launched the 'Journal' upon its career, he fulfilled, with unwearied devotion and singular success, all the duties of Editorship, and each volume issued during that time bears the unmistakable impress of his individuality. Having marked out a distinct path for others to follow, he then handed over his responsibility to another—the late Mr. Josiah Goodwin—who was sufficiently in touch with him to understand and appreciate the traditions which had grown up under his fostering care. But he continued to interest himself actively in the work, for, as Chairman of the Journal Committee, he was for many years the guiding spirit of its publication and a help and stay to it up to within a comparatively short time of his death.

He was a constant contributor of articles to the 'Journal' on various subjects very diverse in character, and during his editorship he always furnished what he termed an "Introduction" to each volume. This lightly touched upon leading topics of interest to agriculturists, and any matters of moment affecting the Society, which had transpired since the last issue, were tersely summed up in it. A quiet humour and a play of fancy frequently added to the attractiveness of these contributions, as, for instance, in Vol. iii., where the phraseology of the farm is happily utilised for journalistic purposes, as follows:—

"We are enabled again to lay before our Members a volume which is the produce of their own Society; but we must crave their indulgence, and hope

they will not expect too much from us, remembering that we are but tenants-at-will, and that we have entered into business with a moderate capital. It is early days to talk of 'unexhausted improvements,' and we still want all the help our friends can give us. Moreover, for want of punctuality, we must plead that our crop of papers last year was rather backward, some of the seed sown never came up at all; some of the plants were rather thin, and the season was altogether very late; so that in point of fact the winter came upon us before we were sure of a harvest. The result has been that we have been working up rather dry food through the winter, and we can only hope that those whose ground we occupy will be considerate, and believe that we are really improving tenants. At least for this year we are able to meet the demands of the home market without going abroad for supplies."

Again, in Vol. iv. a hope is expressed that, with respect to that issue, the Members "will be satisfied with its size and quality," and be lenient in their demands for "early maturity," while dilatory contributors are gently reminded that "the work of a farm does not end with the harvest, but begins as soon as the corn is in sheaves; and so, while Mr. Dorrell, at Messrs. Clowes', delivers these sheets to the stitchers, we beg to remind our kind friends that autumn preparation is the life and soul of good farming, and that the Christmas holidays are never favourable to steady work, nor will the engagements of the spring quarter always allow of fetching up lost time."

In the following paragraph, being the concluding one of the introduction to the same volume, occurs the happy thought which gave the Society the apt and appropriate motto that has ever since done duty as its watchword, and bids fair to endure as long as the Society itself:—

"It is the aim of the Bath and West of England Society to do something (however little) to render science more practical, and practice more intelligent, at least in our own favoured district. It is therefore in no ambitious spirit, but in the desire to take home the lesson, that we venture to stamp on our pages the homely motto, 'Work and Learn.'"

The adoption as a motto of this bit of expressive Saxon was the result of a perusal by Sir Thomas of a work by the Rev. Fred. Denison Maurice, for whom he had a great admiration.

Certain characteristics, which were distinguishing marks of the writer, were, in a more or less degree, generally to be found in Sir Thomas's contributions to the 'Journal.' To begin with, he said what he thought without any beating about the bush; and even those who mis-doubted his conclusions were fain to admit that he honestly endeavoured to get to the bottom of a subject before he ventured to write upon it, and that his one object was to elicit the truth. That he was expressing his own earnest convictions could never be doubted, for to no one was the suggestion that language was given us to disguise our thoughts less applicable than to himself.

was not helped in his work by the possession of that order, without which many persons less gifted would be helplessly stranded, and no one was more convinced of that lack than himself. Whilst he was apt, in conversationally, to wander from thought to thought and from subject to subject, it could not be said that he had no power of concentration, because now and then it was strongly in evidence.

He could, more particularly when he was tied for time, summarise in a sentence most effectively what he had to say.

He had a remarkable knack of getting at the core of a matter, and a special facility for hitting upon the weakest link in a chain of argument or a flaw in any process of deduction. He never used a long word when a short one would answer the purpose, or a foreign or scientific one when plain English would express his meaning.

His deep interest he took in education generally, and especially in its bearing upon Agriculture, was manifested by many contributions to the 'Journal' upon the subject. He was as determined a foe to all specialisation in the earlier stages of an education. He held strongly that a boy should have a good general education to start with, irrespective of his vocation in life, was likely to be. As he well puts it in his introduction to Vol. iv. (1856) of the 'Journal':—

It is true that peculiar difficulties attend the education of those to whom practical habits and the knowledge of the market are so important as they are to the young farmer. Books will never teach a lad to farm—that is true; but is a man to be nothing but a farmer? May not books open his mind, widen his sympathies, tell him something worth knowing of other lands, and is mental discipline worth nothing to him?

“Unless above ‘his trade’ he can
Erect himself, how mean a thing is man!”

The young farmer must learn to work, it is true, but will he not work the land willingly for other learning if he is well taught? May he not learn by that work which is really noble? then by working in such a spirit he will gain his knowledge.

A man of true science knows well (no one better) what he has to learn by putting his knowledge to the test of practice; in other words, he knows that learning comes by working. The truly practical man who knows that no one thing well is aware that he would do it better, or at least more skilfully, if he knew more. No human art is perfect, and the best man is always the most humble learner.”

His views upon this point are summed up with much concision in the following sentence of a Report which, at his suggestion, was adopted by the Society's Council in 1857:—

“Skill in business generally is best acquired by practice, and the best foundation for practical life is a good general education.”

This may be said to have formed the text of an admirable article, which, under the title of "The Education of the Farmer," he contributed to Vol. v. (1857) of the 'Journal,' and in this the main lines of an education which would best fit a boy to play his part in life were laid down. The article showed a keen appreciation of the necessities of the case, and a remarkable mastery of all the details of the subject.

To his instigation and subsequent efforts were due the establishment by the Universities of Oxford and Cambridge of that system of local examinations for schools, which has been of such incalculable benefit to the middle classes especially, and so important in its developments. Through Sir Thomas the Bath and West Society had, happily, some part and lot in this great work. In its 'Journal' for 1856 (Vol. iv.) he wrote:—

"A step in the right direction has been taken by the endeavour to act on the existing schools through public examination, to support the honest and competent instructor, and to distinguish him from the impostor who has the art of 'keeping up a good connexion.' Every labourer who sends his son to a school where the master is certificated, every gentleman who sends his son to a public school, knows that the quality of the instruction will be ascertained by public examinations. The preparatory school is tested by the place taken by the pupil when removed to a public school, this again by the exhibitions at college, and the character of every college is known by its position in the University examinations. Even our Universities are pitted against each other and against the world in the examinations for the Civil Service. In all these cases the parent (however highly educated himself) is aided by publicity.

"Can the farmer alone expect justice to be done to his son if he trusts to his own judgment of the results of a school as shown in a score of useless copy-books, which only waste time and swell the bill?"

Early in 1857 he followed this up by laying his scheme before a meeting of the Society's Council, by whom it was cordially endorsed. In the 'Journal' for the same year the leading principle of the scheme is thus referred to:—

"The conclusion to which, after nearly twenty years' attention to the subject, I have arrived, as to the direction in which my own efforts may most usefully be exerted on the subject of middle-class education, is already before the public. My hope rests for the present in giving a definite aim and purpose to the independent action of existing schools; so that parents may know better what to expect, and masters may have some encouragement in the path of duty, subject to this one paramount condition, that sooner or later their work shall be tested by a competent tribunal.

"I hope that we are not far from the establishment and recognition of such a standard and such a tribunal; and that the Bath and West of England Society will have had some share in bringing about such a result."

The same volume contains letters addressed to Sir Thomas from the then Vice-Chancellors of Oxford and Cambridge, acknowledging the importance of the question, and promising to bring the scheme under the notice of their respective Universities with a view to favourable consideration. The following

remark in the letter of the Vice-Chancellor of Oxford (Dr. Williams, the Warden of New Coll.) has found an ample justification in the results which have accrued from the scheme: "Your plan promises to confer great benefit on the middle classes by the improvement of their education; and the co-operation of the University, which I trust will be found practicable, may be serviceable to itself as well as to them."

The present Primate (then an Inspector of Church of England Training Schools) heartily co-operated with Sir Thomas in promoting the scheme, and rendered invaluable assistance. Both in its initial stages and also when the details of its working had to be determined by the Universities themselves, Dr. Temple did much, by his skilful piloting, to bring the matter to a successful issue.

As has been pointed out, Sir Thomas went out of his way to connect the Society closely with the origination and the success of this great educational movement; and when, in 1858, he distributed the certificates to the successful candidates at the first Local Examination held at Bristol by the University of Cambridge, he generously emphasised this by saying: "To my connexion with the Bath and West Society I owe whatever influence I have been enabled to exercise on the progress of the question, which is the cause of our assembling here to-day."

Sir Thomas more than doubted the efficacy of the South Kensington system of agricultural instruction by means of teachers, whose main knowledge of the subject was in many cases derived from books. In an address delivered to Science and Art students at Ilfracombe, published under the title 'Work and Learn,' in Vol. xiii. (1881) of the 'Journal,' he refers to this system in terms which are too characteristic to be left unquoted:—

"Before I pass on to the subject of the Fine Arts—on which I shall not detain you long—I am bound to notice the fact that in this remote corner of North Devon I have come for the first time in contact with a class of practical farmers' sons taking lessons in agriculture from a teacher examined and certified by Government. I am sure that what Mr. Tattam undertakes he will do honestly and well; and in our present depression we are grateful to any Government who will teach us how to make farming pay. I am afraid I am one of those old-fashioned survivors of the pre-scientific period who was taught at Oxford by Aristotle that the only way to become a shoemaker was to try to make shoes, from which my benighted Oxford logic drew the conclusion that the way to be a farmer was to take a farm and try to make it pay, or at least to serve an apprenticeship on a farm under a good farmer, unless the young farmer has plenty of money to buy his own experience."

With all his admiration for the practical, he was, at the same time, equally alive to the scientific side of agriculture; only he would have the two go hand in hand.

The Chemistry of farming continually occupied his thoughts, as his many contributions to the 'Journal' upon the subject testify. In an address delivered to students, and published in the 'Journal' for 1881, he says :—

"I am bound, however, to confess that we have a good deal to learn from Science in our practice, if we know enough to put our questions clearly. More than thirty years ago I went to King's College, and worked in a laboratory for several months, in order to qualify myself to ask questions intelligently on Agricultural Chemistry. I have been questioning ever since, not only for myself, but for many friends who address questions to me. I am sorry to say that the answers come very slowly, and are often, like the oracles of old, rather ambiguous in utterance than safe in their guidance. I have heard to-night the expression, 'Scientific Agriculture.' I confess I attach no clear meaning to the term. The fact is, Agriculture is a most complicated and uncertain Art. The Sciences from which Agriculture seeks help are many; no practical man can master them all. To turn their clearest lessons to good account requires a well-trained mind, and, what is more, a sound judgment."

The above extract not only very well illustrates his views upon the relation of Science to Agriculture, but also his prevailing desire to adequately qualify himself for whatever he undertook. He did not pursue the study of Chemistry in any dilettante spirit, but in order to bring its results to bear upon practical Agriculture, or, in his own words, "upon the production of food for the people."

To Vols. iii. and iv. (1855 and 1856) of the 'Journal' he contributed two articles on "The Chemistry of Practical Farming," and in the second of these he dwelt particularly upon the researches of Mr. (now Sir John) Lawes and Dr. (now Sir Henry Gilbert), which had been called in question by Baron Liebig. In succeeding volumes will be found many notes by him upon field experiments carried out by the Bath and West and other Societies and by himself. His main object in all such writings was not to promulgate new theories, but to show how the ascertained results of scientific inquiry could best be utilised in the interest of Agriculture. He was constantly endeavouring to simplify science for the benefit of the ordinary farmer, and to this end he issued, in 1891, "An Introduction to the Chemistry of Farming," his main object being, as he said, "to put into common words a few truths which in a hard scientific form repel the practical man." In this work many of the experiences that he had previously recorded in the 'Journal,' with the lessons they inculcated, were drawn upon for illustration purposes. He always gratefully acknowledged the value of the help he received in his scientific studies from the late Dr. Voelcker, for whom he had a great regard, and he contributed a very appreciative memoir of him to the 1884 volume of the 'Journal.'

Although Sir Thomas had provided the Society with a new constitution and a literary mouthpiece, and had identified it with one of the most important educational movements of the century, he had by no means exhausted his programme.

The founders of the Bath Society defined its object as "the encouragement of Agriculture, Arts, Manufactures, and Commerce," and in its earlier days both painting and sculpture came therefore within the natural scope of its observation.

Sir Thomas, who, besides being an accomplished worker in water-colour, had a keen appreciation of Art in the widest sense of the term, saw, with his usual prescience, how this traditional association with Art might, with some modification of conditions, be perpetuated under the new *régime*. His plan, which involved a divergence from the beaten track of Agricultural Shows, proposed to add to the ordinary attractions of the Show Yard, exhibits illustrative of art and art-manufactures; his object being, to use his own words, "to engraft on the rapid improvement in agricultural produce and machinery a corresponding improvement in taste, and thereby to extend the local demand for works of art and manufacture, whether useful or ornamental, of the highest quality and the best design."

In Vol. vii. (1859) of the 'Journal,' in what he termed "An Elementary Introduction to the Principles and History of Art," he gave an admirably clear exposition of art and of what it consisted in. He showed the close connection between the useful and the beautiful, and the relationship that existed between Art and Agricultural improvement. He says:—

"It would be a great mistake to suppose that the Fine Arts do not tend to practical utility in a very real and important sense. Their noblest use is, doubtless, to 'purify enjoyment,' and to cull from Nature noble suggestions as types of a higher state of things.

"But, in a lower sense also, the Fine Arts prove their utility. In proportion as they are cultivated by a nation in a right spirit, the taste developed by the higher artist gradually influences various kinds of manufactures; and, in certain states of the world, taste is so intimately connected with manufacturing prosperity, that a nation which neglects the cultivation of taste runs a serious risk of being beaten in the race of competition."

And further on he says:—

"I venture to utter the hope that Art is about to take its place as a humanizing element in the education of the middle classes; and that every year will show more plainly that the Arts are neither a mere luxury reserved for the wealthy nor an accomplishment intended to minister to personal vanity, but are among the means given to us to call forth admiration of what is good and pure."

It is not too much to say that this aspiration has been fulfilled.

The Arts section of the Society was, after all, but another application of his principle that every one should have a "good

general education," which he would contend would be incomplete if Art had no place in it.

Sir Thomas having won over the Society's Council to his views, an Arts Committee, with himself as Chairman, was appointed, and exhibitions of pictures and Art manufactures were, for the first time in connection with the Society, held at its Show at Barnstaple in 1859. Sir Thomas grafted on to his plan an Art Union, and this has resulted in the disposal of pictures to the amount of several thousand pounds, thereby affording practical help and encouragement to many young artists.

The supposed incongruity of bringing Agriculture and Art into this close companionship has in the past afforded some food for criticism. But in these latter days the necessity of providing for the recreative wants and the artistic tastes of human nature is generally admitted, and the force of the plea for the establishment of a connecting link between those whose work appeals to the higher senses and those occupied in more prosaic though not less important, pursuits, is becoming more and more recognised. Whatever tends to a more complete understanding by each class of workers of the aims and aspirations of the other cannot but conduce to the benefit of both. Agriculture has been too isolated in the past, and if, by recognition of some of the refining influences of life, its Societies are brought more into touch with the outer world, that, itself, must supply some justification for a policy somewhat cosmopolitan in its sympathies. Sir Thomas held that an Agricultural Society was not going outside its sphere of usefulness when it endeavoured to foster a love of the beautiful in the minds of the multitudes attracted to its exhibitions, and the fact that the Art Section still holds its own after a forty years' trial may be taken as some proof of the correctness of his view. Whilst the Society's Picture Gallery has fulfilled its object as a medium for bringing Works of Art to the notice of many who would not otherwise become acquainted with them, the Art Manufactures Gallery has afforded opportunity for displaying the special art-products of a district and the technical work of its schools.

Although, as has been seen, Sir Thomas attached the high importance to the holding of an Annual Show of Stock and Implements, he always maintained that a Society ought not to be content to concentrate all its efforts upon it. In fact, in later days, he advocated some retrenchment in the Society's expenditure upon prizes for stock, with a view to greater assistance being given to experimental and research work and to practical instruction in agricultural operations.

deprecated the growing tendency of Societies to augment, beyond reasonable limits, the monetary value of the prize list, and contended that neither the standard of quality was raised, nor the area of competition proportionately increased, thereby. Although he did not entirely succeed in converting the Council to his views, he was not alone in his belief that the time was approaching when some modification in the direction he indicated would be found necessary.

But, as the Society had a reserve fund, the Council were not unwilling to entertain proposals for an extension of its work as long as the Show-money did not in consequence suffer curtailment. This disposition was taken advantage of by the late Mr. J. E. Knollys, who, acting in conjunction with Sir Thomas, moved at a meeting of the Council in March, 1885, for the appointment of a Special Committee "to consider whether the present application of the funds of the Society was that best calculated to promote the interests of Agriculture"; this, after an animated debate and some opposition, was carried on a division. At the following Council, the Committee, of which Mr. Knollys was Chairman, presented a Report which expressed the opinion that, "while the interests of Agriculture had been and were materially promoted by the present work of the Society, as represented by its Annual Show and by its publications, and that material alteration in this might not be desirable, the existing work of the Society was insufficient to meet the requirements of the present time, and that the efforts of the Society should be extended in other directions for the benefit of Agriculture."

The Report, with which Sir Thomas had much to do, then laid down the lines of this extension, the main objects of which were stated to be :—

"(a) The establishment of a system of practical experiments to test the advantages, or otherwise, of the use of artificial manures, on corn and grass, on land in ordinary farming condition, based on the results obtained from the Rothamstead and Woburn experiments.

"(b) The examination and testing of any new processes for dealing with agricultural produce.

"(c) The improvement of dairying.

"(d) The collection and publication of information on new systems of cultivation, routine of crops, or other efforts which are being made for the profitable cultivation of land under probable low prices of corn."

The conciliatory attitude of the Report with respect to the Show did much to disarm opposition to it. Mr. Knollys and Sir Thomas were warmly supported by Sir R. H. Paget, Mr. Duckham, Mr. Acland, and others, the result being that the Report was adopted unanimously, and a Standing Committee was appointed, with Mr. Knollys as Chairman, to carry its pro-

posals into effect. Upon the death, in 1892, of Mr. Knolly, who had by his remarkable ability and practical experience been an invaluable help to the Society, Sir Thomas succeeded to the Chairmanship, which he held up to the time of his decease.

So long as his health permitted, Sir Thomas actively associated himself with the work of the Committee, and gave material assistance in the drawing up of schemes for experiments upon farm crops. He also initiated, upon his Killert estate, several useful experiments both in connection with crops and with the feeding of stock. In this way he rendered valuable service to Agriculture, for he was always ready, for the benefit of others, and at his own cost, to test results with a view of solving some of the problems that beset agriculturists. But, while he brought to bear upon his farming operative practice and science allied with skill and enterprise, he was always strictly regardful of the cost. He did not want to show what an unlimited expenditure could achieve, but rather what was practicable under ordinary farming conditions. He kept stock, as he would explain, "for the purpose of making beef, mutton, and pork for the market in the most economical manner," and he wished his buildings, implements, &c., to be of an ordinary character, such as would not be outside the reach of a tenant farmer. It need hardly be said that he had a specially keen interest in the breeds of live stock particularly associated with those western counties in which his property was situated, and his old-established herd of Exmoor ponies had a wide reputation.

The effect of the new departure of the Council was important and far-reaching, for it resulted in providing the Society with sufficient materials to keep it actively occupied all the year round, and thus enabled it to still further justify its existence. The Government, as represented first by the Privy Council and afterwards by the Board of Agriculture, has, both in respect to Parliament, and by grants in aid, fully recognised the utility of its work in a new sphere. This recognition was a stimulus to further action, and other members of Council were encouraged to bring their knowledge and ability to bear upon the promotion of similar objects for the benefit of Agriculture. The result has been the establishment of a Working Dairy as a permanent feature of the Show Yard, the institution (in conjunction with County Councils) of Schools for instruction in dairying and farriery, and of stations for experimental and research work in connection with cheese-making and cider-making. Sir Thomas heartily supported those of the Council—Sir R. H. Paget, Mr. G. Gibbons, Mr. Maskelyne, Mr. Acland (the present

baronet), Mr. Neville Grenville, and others—to whose action and advocacy these later developments of a progressive policy have been especially due.

Sir Thomas took particular interest in dairying, and in 1885 contributed to the 'Journal' some "Notes" upon the Working Dairy in the Show Yard. He also sent the manageress of his own dairy to several of the shows in order that she might demonstrate the making of Devonshire butter and cream. Until recent years, when the physical disabilities of old age began to assert themselves, he himself was a familiar and prominent figure in the Show Yard Dairy, where, at a moment's notice, he would deliver an address upon some branch or other of the subject. No speaker was listened to with more attention or could command a better audience, for the unconventionality of his style and his resourcefulness of illustration were in themselves attractions. He spoke in a language "understood of the people"—particularly agriculturists—and he knew how to drive a truth home with a stroke of humour. Country folk, when they are out for a holiday, do not usually evince much anxiety to hear others talk, but they would come into my office at the Show to inquire when Sir Thomas would "lecture"—though he himself would indignantly repudiate the idea of delivering himself of anything so pretentious or so cut-and-dried as was thereby implied. Nor would he enter into any undertaking beforehand to deliver an address upon a specified subject at a specified hour; he disliked what he considered the "ostentatiousness" of this. But some one who knew how to serve the cause would, at a favourable juncture, beg Sir Thomas to say "just a few words" to the butter-making competitors and others. And then, after a preliminary declaration that he was not going to occupy their time for more than a few moments, he would hold their attention for half an hour at least, and everybody was sorry when he had finished.

The very last occasion on which I heard his voice was when he addressed the pupils of one of the Society's Dairy Schools, which, by his special invitation, was held at Killerton, in the autumn of 1894. Some time previously his letters had begun to arrive with much less frequency, and there was the oft-expressed regret in them that failing strength prevented his doing all he could wish for the old Society. Nevertheless, I heard from him only a very few weeks before his death, and he retained his interest in the Society to the very last.

This record has been necessarily limited to recalling some of the services rendered to one particular Society; it would require many more pages than the whole of this volume includes to do even partial justice to the other activities of such

a career. It is much to be hoped that some memoir may be forthcoming which will deal with the varied aspects of a life so strenuous, so full of interest, and so many-sided; a life in which the scholar, the educationalist, the politician, the agriculturist, and the landowner all bore a distinguished part. For a lengthened period he occupied—by virtue of the manifold nature of his abilities, his interests, his sympathies and his labours—an exceptional position in the world at large. Yet, probably, no memory of him will be more attractive and enduring than that which connects him, as “the Squire Killerton,” with his great inheritance.

In the spirit of the injunction that property has its duties as well as its rights, it can be truly said that he regarded his possessions as a trust to be administered for the benefit of those around him. The acknowledged head of a large community he lived upon his estates in the midst of his people, interested himself in, and bringing his exceptional intellectual gifts to bear upon, the promotion of all that concerned their well-being.

An instance of this is furnished by a pamphlet, printed for private circulation at Whitsuntide, 1873, which is described on its title-page as “A letter from Sir T. D. Acland to the Parishioners of Broadclyst, especially to the agricultural labourers and their wives, with proposals relating to medical relief of families, education, and ready-money payments.”

In this pamphlet is given particulars of a carefully thought-out scheme “to promote provident habits among the working men, women, and youths” around him. Sir Thomas was a believer in indiscriminate almsgiving, his principle, as here set forth, being to help those who help themselves. Therefore he proposed to supplement from his own purse—and in a very generous spirit—the efforts of those who were themselves prepared to practice thrift. But the letter indicates something more than mere kindness and forethought in the writing; hence this special reference to it. An occasional brusqueness of manner in Sir Thomas was sometimes put down to a lack of patience with human weaknesses, and might give the impression that he was made of “sterner stuff” than ordinary mortals. But it only needed a cry of suffering or of poverty to show the depth of his tenderness and sympathy. It is this side of his character, which, from its unobtrusiveness, was better known to his domestic circle than to the world at large, that this pamphlet brings into relief. In it, he addresses those whom he calls “my neighbours and friends” with simple earnestness, and in the spirit of a father taking his children into his confidence. Anxious not to force his own views merely upon those whose welfare he has at heart, a

recognising that their feelings and opinions are factors in the case, he expresses his belief that habits of forethought and prudence can be helped on "if we lay our heads together with an honest desire to act fairly between man and man." After pointing out certain feelings and habits which had tended to produce a loss of self-respect and manly independence in the labourer and to prevent his doing all he should for himself and those dependent upon him, he exclaims, in his desire not to be misunderstood, "Do not, I pray you, think that I am indifferent to the hard struggle for a living which many fathers and mothers have to make for their own children."

The following reference to his father, whose memory, as is well known, he ever held in honour and reverence, is so beautiful in sentiment and expression that no excuse is needed for quoting it:—

"We are bound together by many ties of common interest, perhaps by none more closely than by the memory of the long life of one who was like a father to many of you as well as to me and to my children. If I may select on this occasion for my own guidance one principle of action for which he was most remarkable, it was his desire to enter into the feelings, wishes, even prejudices of others, while he was trying to raise them to a higher level of Christian action and to strengthen the links of Christian brotherhood."

After alluding to the rise of wages which had recently taken place in the parish "without any agitation, owing to the good sense and good feeling of the masters, and, I may add, of the men also," he points out that:—

"The rise of wages alone will not cure the evils flowing from pauperism and intemperance. Indeed, there is some ground for fearing that it may make matters worse, unless accompanied by education and providence. . . . I am sure neither farmers nor landowners have anything to fear from a self-reliant provident body of educated labourers. But all classes have a great deal to fear from intemperance and pauperism."

* * * * *

"What I really care for is, that the labourers' families should be the better for the rise of wages; that they should be better fed, more substantially clothed, more soundly educated, and have something to look forward to which shall make them feel that the tillage of the land and the care of the live stock afford a happy and useful occupation, one on which a man can bring up his family respectably, put some into trades, and do something to make his parents comfortable in their old age, instead of leaving them to go to the Union House or live on scanty parish pay."

As will have been seen, from the foregoing, his interest in Agriculture was by no means confined to the classes represented by the landowner and the farmer; indeed, he devoted much thought also to all that concerned the labourer and his surroundings. There is evidence of this in the 1871 'Journal,' wherein he gives an account of his efforts to deal with the difficulties of sewage and water supply in the village of Broad-

clyst, and this article—a most useful and practical one—strikingly testifies to his knowledge of the science of sanitation and his keen desire to promote it.

In his Report, previously referred to, on 'The Farming Somerset,' he devotes several pages to discussing the state of the labourers, in connection with their employment and the habitations, and forcibly pleads for the provision for labourers of decent cottages near their work with a bit of garden ground. In relation to this he says :—

"If proprietors were aware of the deep feelings excited by any attempt to evade the fair burden of providing houses for those who labour on their land, and relief for those who are disabled, the satisfaction which they may derive from the skilful management of their estates would be much diminished."

The food of the labourer was a matter that likewise interested him, and at Shows he would make a point of visiting the portion of the refreshment department in which special provision was made for the servants in charge of stock, with a view to seeing that the food was of good quality and supplied at a reasonable charge.

The versatility of his knowledge was very remarkable. Shortly after my appointment, sixteen years ago, to the Secretaryship of the Bath and West Society, he kindly invited me to visit him at Killerton. When I accepted, he knew him by reputation only—in connection with Oxford—a "double-first man" and a great educationalist and—in connection with the West—as a large landowner and a staunch supporter of the Society. Concluding that, under the circumstances, Agriculture would be the staple subject of our discussion, I took the precaution, as I travelled down, to read up his views as expressed in the 'Journal,' in the hope, if conversational flags were flagged, of having something to fall back upon. But I never have had no fears that there would be any hiatus for lack of topics—the difficulty, rather, was the plethora and diversity of them. Nor was it always easy to keep pace with my host's transitions of thought, which oft-times, with startling suddenness, diverted the course of the conversational current into unexpected channels.

His talk was apt to be a little overwhelming, owing to complete absorption in any subject uppermost in his mind ; to the velocity with which he poured forth his thoughts ; to the sometimes lessened effectiveness of what he had to impart. He could not always pull himself up, even when he felt it was time to do so ; and, as he was of too kindly a nature intentioned to overtax anyone's attention, he was full of regrets when he realised the possibility of having done so.

Agriculture was, after all, but one item in an apparen

inexhaustible programme, and, as Sir Thomas could do nothing by halves, his enthusiasm was kindled by whatever had possession of him at the moment. If Art were the topic, one could well suppose that it was his predominant passion; but a change of conversation induced the belief that Agriculture monopolised his energies. Ere long, however, one was led to think that Chemistry had first claim upon him; to which conclusion an element of doubt was imparted when the philosophical bent of his mind was disclosed. In this latter direction lay his final literary effort, "Knowledge, Duty, and Faith"; a title which may be said to embody the watchwords of his own life. Wide, indeed, was the range of his acquirements and of his sympathies. As a host, the grace of his old-fashioned courtesy was something to be grateful for in these free-and-easy days.

He was fearless in the expression of his opinions, whether they were popular or unpopular, and sometimes they bore hardly upon cherished convictions; but his transparent sincerity, if it could not convince, at least, could never be doubted. He was apt to chafe under what he considered the unnecessary restraints and delays of diplomatic methods, and occasionally he hindered somewhat the attainment of an end by too readily taking one of those short cuts which are ultimately found to be the longest way round. His natural impulsiveness led him to prefer a sudden *coup de main* to a deliberate siege, and when once he had convinced himself—which sometimes happened with lightning rapidity—of the desirability of a certain course, he could not easily realise that there could be any possible obstacle to following it.

When he felt strongly, so he spoke, for speech then was not to be denied. I have known him at a meeting suddenly vacate the chair because he wished, as he put it, "to say something very unparliamentary." But no one could make more generous amends if he found that his frankness or abruptness had wounded any susceptibility.

It has been generally thought that, as a likeness, the portrait (reproduced from a photograph taken in the Show Yard at Exeter during the 1889 Meeting) which, by the courtesy of the proprietors of the 'Agricultural Gazette,' illustrates this memoir, is the best of him that has been published; but nothing less than life could fully convey that rugged picturesqueness of face which had so great a charm or the light in the eye that, on occasion, was so full of humour. Those who saw him in the Show Yard will recall him "in his habit as he lived," for his strikingly fine physique was not easily forgotten. Clad in a rough home-spun suit with a satchel

of agricultural literature for distribution slung low down at his side, he would—with some brief spells of rest in the Secretary's office—stride about the Yard all day with an uprightness of body and a power and elasticity of gait which many a man twenty years younger—for he could thus be seen when he was close upon eighty—might envy.

The offices, which at one time or another he filled, sufficiently testify to the estimation in which he was held by the Society. In addition to those already referred to, he was the President in 1862, when the Annual Meeting was held at Wells, and at the time of his death he was a Vice-President and the Senior Trustee, which latter office he had held since 1868.

As, has been seen, he was prodigal in devoting his intellectual gifts to the service of the Society ; but, it should be added, that he was also both directly and indirectly a generous contributor to its funds, as well as a source of strength to it by his active advocacy of its claims upon landowners and farmers alike. When he beat up for recruits, his persuasiveness brought many additions to the roll of membership, and I remember his proposing no less than seventy-one new Members at one Council Meeting.

Although the Bath and West Society held the foremost place in his public attachments, his interest in such Associations did not begin and end there. He was one of the founders of the Royal Agricultural Society of England, of whose Council he became a member as far back as 1838, and was its Senior Trustee. He was also a Vice-President of the British Dairy Farmers Association, and a liberal supporter of many local agricultural organisations.

He lay upon his death-bed when the Society he loved so well was holding its Annual Show at Cardiff, and one of his last inquiries related to it. The end came on Sunday, May 29, 1898, and on the following day the flags at half-mast on the exhibitors' stands, as well as on the official buildings, testified to the universal regret and to the general sense of loss which was felt. He had just entered upon his ninetieth year, having been born on May 25, 1809.

In the presence of many of his old friends and colleagues upon the Council, his body was laid to rest in the soil of his native county at Columb John, near the ancestral home of Killerton. The impressive simplicity of the service, so completely in accord with the life just closed, the beauty of the rural surroundings, lighted up by the bright sunshine of an ideal day, and the hushed stillness of the dense crowd gathered from near and far to do honour to its departed chieftain, will not soon fade from the memory of those who took part. Truly,

he was "buried in peace," for the last rites were all-suggestive of sweet restfulness!

True, staunch, and devoted, giving of his best ungrudgingly for pure love of the cause, he was the personification of that disinterested earnestness which, in times of stress and strain, has done so much to sustain Agriculture. Although such gifts as he was endowed with, and such opportunities for good as resulted therefrom, are vouchsafed but to the few, he did not stand alone in his aspirations and in his endeavours to realise them—and, in this respect, happily, his name and his race survive.

At the July meeting of the Society's Council, the President (Lord Clinton) thus referred to his services to the world at large:—

"By the death of Sir Thomas Acland we have lost an old and valued friend, but regret for his loss will be felt by a far larger public than that which is represented by our Society. His life and work have been prominent in this country for more than half-a-century, and there has been scarcely a useful movement or institution set on foot or established during that time which does not owe something to the efforts of his active mind, either in its initiation, its development, or its improvement. His labours have been seen in Parliament and out of it, in connection especially with agriculture, with education in all its branches, and with the reserve forces. Even to those who were not always in agreement with him, it was obvious that his motives were ever thoroughly honest and unselfish, and actuated by what, I think I may say, was the guiding principle of his life, the devotion of his talents, his opportunities, his means, and his position to promote, in the widest and best sense, the welfare and the happiness of his fellow-men."

His lordship having alluded to the special indebtedness of the Society to him, moved the following resolution:—

(1) "That the Council, at this its first meeting since the death of the Right Hon. Sir Thomas Dyke Acland, Bart., desires to place on record its deep sense of the loss which the Society has thereby sustained. As the author, nearly fifty years ago, of the 'great revival' of the Society, he endowed it with a vitality which has enabled it to extend the area of its operations and the sphere of its usefulness far beyond the limits which the highest expectations of its original promoters assigned to them. But, great as was the service he then rendered, it was excelled by the devotion of succeeding years, for it is impossible to estimate how much the Society has owed to his distinguished ability, his untiring energy, and his generous support. As a former President of the Society, and as

a Vice-President, Trustee, and Chairman of several important Committees, his invaluable assistance was ungrudgingly given, and especially in connection with the Society's annual 'Journal,' of which he was for several years the Editor and for a long period the guiding spirit. To this tribute of gratitude to the memory of one who was no ordinary benefactor to the Society the Council desires to add its sincere sympathy with all the members of his family in the loss which they have sustained." (2) "That a copy of this resolution be forwarded to Sir C. T. D. Acland, Bart."

This was seconded by Sir J. F. Lennard, Bart., supported by Mr. N. Story-Maskelyne, F.R.S., and unanimously adopted.

Original Articles and Reports.

I.—*Sheep-Scab.* By Professor WORTLEY AXE.

1 farm animals, sheep more than any others are the
is of skin parasites. Ticks, lice, fags, and maggots,
air harassing effects, are productive of considerable loss
farmer; but the most pernicious and troublesome of all
acarus, to which we owe the disease commonly called
p-scab."

ie idea of the prevalence and persistence of sheep-scab in
Britain will be gathered from the fact that during the
venty-one years it has on an average prevailed each year in
y-seven counties, with an average of 2,138 outbreaks in
ounty.

the five years, from 1892 to 1896 inclusive, there were
outbreaks, or an average of 2,871 per annum. Of these
occurred in England, representing a sheep population of
,571; 986 in Scotland, representing a sheep population
7,508; and 4,828 in Wales, representing a sheep population
32,541, so that the proportion of outbreaks to sheep which
ed in Wales was more than three times over and above
1 England, and over twelve times greater than that in
nd. Moreover, while in England the 8,547 outbreaks
spread over forty-one counties, the 986 in Scotland were
ty-four counties, and the 4,828 in Wales were in twelve
es.

SPREAD OF THE DISEASE.

liability to the introduction of scab into clean flocks varies
much with the locality and character of the farm, the
of farming, and the consequent traffic in stock, and in a
measure, too, with the care and intelligence brought to bear
se who are responsible for the management of the flock.
f our breeders of pedigree sheep have any home experience
disease, and in addressing the Minister of Agriculture a
ime ago as one of a deputation, Mr. Edwin Ellis was able
that at that time "there was not a single case of sheep-
fecting any of the first class pedigree flocks" connected
ne Sheep Breeder's Association. The reason of this will
id in the fact that these gentlemen breed their own stock,
ith the exception of the periodical introduction of rams
y of a change of blood, do but little recruiting from

extraneous sources, and consequently incur no risk of exposure to infection. Moreover, the nature of the disorder is well understood by them, and every precaution is taken to guard themselves against other sources of infection. Greater risks prevail among those whose land is not fit for the wintering of sheep, and requires to be re-stocked each spring, while a still greater risk is incurred by others who in course of trade are habitually selling out and buying in. In the latter case, however, with reasonable care and such information as flock-masters ought to possess as to the nature of scab, the chances of introducing the disease on to a farm may be very considerably curtailed, if it cannot be altogether prevented.

Too frequently care and judgment "go to the wind" under the seductive influence of an abatement of two or three shillings per head in the price, and it is in the experience of the writer that there are men who for this miserable consideration will accept the risk and reproach of spreading infection, and to such men, in no inconsiderable measure, do we owe the continued wide prevalence of this and other diseases, and the difficulty in suppressing them. Among other causes of its spread and maintenance not the least fruitful is to be found in the management—or, rather, mismanagement—of mountain sheep. Here the extensive range of ground, the mixing of flocks, and the difficulty of shepherding, conduce to neglect, and especially is this the case in some parts of South Wales, where many of the sheep are owned by men who supplement their small business of sheep farming by doing collier's work in and about the neighbouring pits. Such people see but little of their stock for months together, and if once scab gets among them it goes on unchecked, spreading from one hill to another without let or hindrance. For these and other reasons, Wales has long been a hotbed of the disease and the source whence our English counties annually recruit their stock of infection.

Statistics relating to this, as to most other contagious diseases, cannot be accepted as presenting more than a mere approximate statement of the case, but after making reasonable allowance for discrepancy it still remains permissible to conclude that Wales is a veritable nursery of contagion, and the head centre whence the disease is distributed over the Midland and Southern counties. There can be no more convincing proof of this than the fact that the five counties bordering on Wales, viz., Monmouth, Hereford, Salop, Chester, and Lancaster, are far more heavily stricken with the disease than any similar number of other counties in England, having regard to sheep population—indeed, taking again the five years from 1892 to 1896, I find the total number of outbreaks recorded against these counties

s 2,799 in a sheep stock of 1,377,264, which gives a proportion of outbreaks to sheep approaching that of Wales itself.

It is further noticeable that in passing from west to east, the counties adjoining the five already referred to, viz., Gloucester, Worcester, Stafford, and Derby, show a specially heavy incidence of the disease—the four counties in the period under consideration having yielded 689 outbreaks in a sheep population of 15,823.

This is made abundantly clear by reference to the following table, from which it will be seen that the number of outbreaks occurring in the five counties adjoining Wales are, in proportion to the sheep population, much greater than five of the worst affected counties in the country.

TABLE SHOWING THE NUMBER OF OUTBREAKS OF SCAB IN FIVE COUNTIES ADJOINING WALES DURING THE FIVE YEARS, FROM 1892 TO 1896 INCLUSIVE, AND APPROXIMATE SHEEP POPULATION IN EACH COUNTY, COMPARED WITH FIVE OF THE WORST AFFECTED COUNTIES IN ENGLAND.

County.	Number of Outbreaks.	Approximate Sheep Population.
Monmouth	1,264	201,274
Hereford	363	318,593
Salop	232	457,987
Chester	338	92,456
Lancaster	602	306,954
	2,799	1,377,264
York	1,570	1,883,456
Cumberland	871	550,404
Westmoreland	376	370,725
Durham	279	242,761
Lincoln	258	1,176,653
	3,354	4,223,999

TABLE SHOWING THE NUMBER OF OUTBREAKS OF SCAB IN FIVE OF THE WORST INFECTED COUNTIES OF WALES DURING THE FIVE YEARS, FROM 1892 TO 1896 INCLUSIVE, AND APPROXIMATE SHEEP POPULATION IN EACH COUNTY.

County.	Number of Outbreaks.	Approximate Sheep Population.
Carmarthen	486	234,606
Carnarvon	375	235,707
Denbigh	869	296,794
Glamorgan	420	292,786
Merioneth	1,293	376,853
	3,443	1,436,746

It need hardly be stated that the dissemination of scab is also largely effected by the ordinary local traffic in sheep. In markets and fairs and in railway trucks, where they are closely packed together, every opportunity is afforded for the transference of the parasites from one animal to another, and there can be little doubt that these places and vehicles, after containing or carrying animals suffering from the disorder, often become centres of infection. The practice of using wooden pens in markets, fairs, and other places, is especially favourable to the propagation of the disease, by affording lodgment for the scab parasite.

Healthy animals driven along roads sometimes receive infection from locks of scabby wool left by diseased sheep, or by rubbing against places which such sheep have previously used.

GENERAL CHARACTERS AND HABITS OF THE PARASITE.

The scab parasite (Figs. 1 and 2) is a minute pale-looking creature just distinguishable by the naked eye, but readily and distinctly seen under a glass having a magnifying power of ten diameters. It has a round or ovoid body, having eight legs, and a more or less pointed head. Although these general characters serve to indicate the family of mites, there are certain details in the matter of form, size, and arrangement of parts by which one is distinguished from another. It results from this that there are three varieties of scab mite technically named:—

1. *Sarcoptes*.
2. *Psoroptes*.
3. *Symbiotes*.

The first is recognised by its small body, short thick legs, and powerful jaws. It possesses, too, the peculiar habit of burrowing beneath the cuticle, and forming little chambers in which it deposits its eggs and hatches out its offspring. It is further distinguished by its habitat or the part of the body it infests. For some reason, not very apparent, it invariably occupies the hairy parts of the face, and inflicts its ravages on the nose and parts about the eyes and ears.

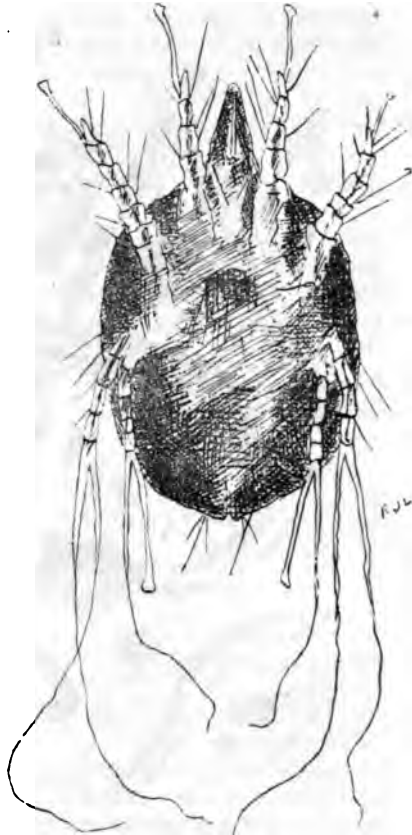
The second (*Psoroptes*) differs from the first in having a larger body, much longer legs, and a more pointed head. It is not a burrowing mite, but wanders about on the surface, and lives on the fluids of the body obtained by forcing its sharp pointed mouth into the skin. This acarus takes up its abode on the woolly parts of the body, and especially where the wool is most abundant, as the back, loin, and sides. It is to this creature we owe the common scab of this country.

he third variety (*Symbiotes*) has, like the first, an oval body and long thin legs, but differs from it in having no hooks to its rostrum, and in other minor details which need be considered here. It infests the legs, more especially below the knees, and hocks, and is sometimes said to ascend and attack the scrotum in the ram and the udder in the ewe.

Fig. 1.—



Fig. 2.—



Psoroptes Communis (Var.) *Ovis* (The Common Scab Mite).
1. Male. 2. Female.

variety of the affection, as well as the sarcoptic mange, is form of the disease seldom, if ever, seen in this country.

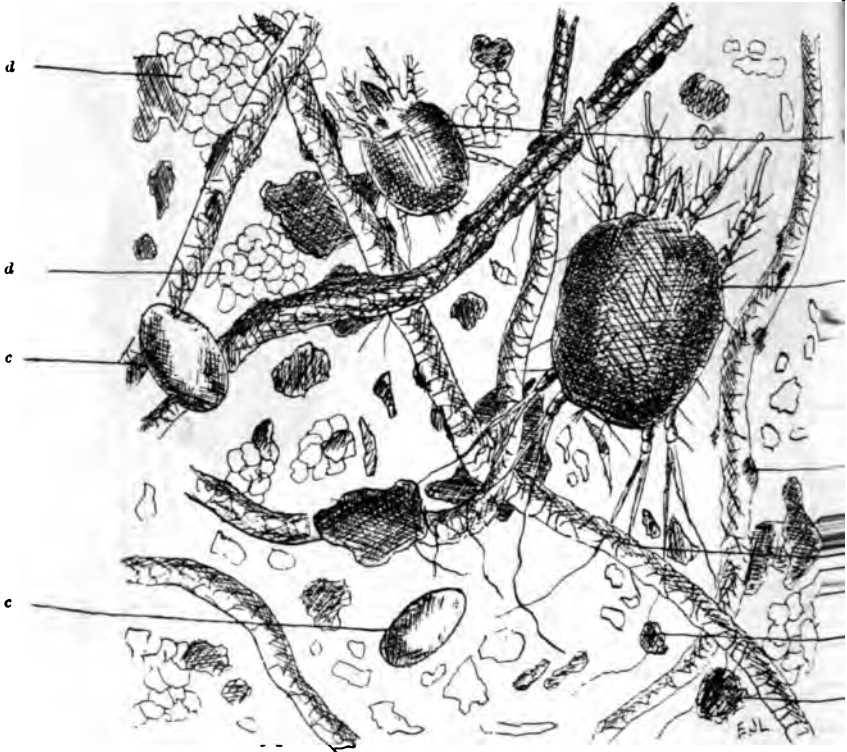
PROPAGATION OF MITES.

The sexes of the scab acarus present broad and striking differences, so that they can be readily distinguished from

other. The male is always smaller than the female, and the fourth pair of legs are short and stumpy, while the third, counting from the head, are long. Moreover, the three first pairs of legs end in a broad cup-like extremity. In the female this peculiarity exists in the first, second, and fourth pairs, but is absent in the third.

Propagation of the species is effected by means of eggs, which are deposited upon the scabby parts of the skin, and after

Fig. 3.—



Scabby Matter, Parasites, and Eggs, as seen by the Microscope.
 a. White. b. Six-legged Larva. cc. Eggs. dd. Masses of Cuticle.
 e e. Fibres of Wool. ff. Dried Exudation Matter.

a variable period of incubation bring forth their young. The time taken in this process is fixed by some at from two to three days, while others estimate it to range from six to ten days, depending upon the more or less favourable conditions under which the eggs are placed. Warm, humid, sunny weather, combined with a thick dense fleece on the back of the sheep,

sten the hatching out, while extreme cold and scant covering retard it.

From a sanitary standpoint it is important to notice that the eggs of the scab mite will, under suitable conditions, retain their vitality for several weeks after being transferred from sheep to posts, rails, &c., by the act of rubbing; and to prove fruitful and infective the eggs have only to regain the body of a sheep and pass through the required period of incubation.

When the young parasite emerges from the egg its development is incomplete in several important particulars, especially regards the sexual organs and the organs of locomotion.

At this time the former are absent, and only six of the eight legs have appeared, the fourth or hindmost pair being as yet undeveloped. After moulting two or three times they appear in their place, and later on the sexual organs are formed, and reproduction commences.

It has been estimated by Gerlach that each female parasite produces on an average fifteen young ones, five of which are males, and ten females. The generative faculty is reached when they are fifteen days old, and he fixed a progressive rate of increase, which, although having no pretensions to mathematical exactitude, gives an idea of the multiplication of these parasites and the rapidity with which scabies is propagated among men and animals.

1st Generation after 15 days	..	10 females	5 males.
2nd	" " 30 "	100 "	50 " "
3rd	" " 45 "	1,000 "	500 " "
4th	" " 60 "	10,000 "	5,000 " "
5th	" " 75 "	100,000 "	50,000 " "
6th	" " 90 "	1,000,000 "	500,000 " "

So that from two individuals, male and female, there are one million five hundred thousand descendants in about three months.

SYMPTOMS.

The symptoms presented in sheep-scab vary from time to time during the progress of the disease, and will be more or less diagnostic according to the stage to which it has attained. How soon after reception of the parasite infected sheep will give evidence of its presence cannot be precisely stated. The incubation period of the disease will be longer or shorter according as the invading host are many or few. When large numbers of acari gain access to an animal at once, the symptoms may appear in a few days, but in other circumstances ten to fifteen days may elapse before any reliable indication of their presence is given, and from this time onward the sympto

become more and more marked as the parasites increase in numbers.

The first and most striking indication of the disorder is persistent irritation of the skin. This is manifested in various ways and with gradually increasing severity. At first the affected animals are noticed to be restless, they repeatedly break off feeding, and turning the head sharply to one side or the other, seize and pull the wool, and nibble the skin at or near the irritable spot, or rub the body forcibly against some fixed object, such as posts, rails, hurdles, or whatever may be immediately accessible. If the back of a sheep affected with scab be lightly scratched with the fingers, especially over the affected part, the lips of the animal are thrown into active movement, and the head is turned in the direction of the place irritated. By some shepherds and flock-masters this is looked upon as a reliable indication of the existence of the disease. As, however, the same movements and behaviour is sometimes induced by other irritable affections of the skin, it cannot in itself be held to have much diagnostic value. At the same time, it must be understood that when sheep can be induced to act in the manner referred to, the case may be reasonably suspected, and should receive the most careful examination and treatment.

Scratching the elbows and the abdomen with the hind feet is a common symptom of the disease, and it is while performing this act that scab-infected animals so frequently become overthrown, especially when pastured on ridge and furrow, or running over irregular ground. As a consequence of this rubbing, scratching, and biting, the fleece presents a broken ragged appearance, and while loose locks of wool hang from it others are seen scattered about the pastures or folds, and attached to hurdles, fences, and other places used for the purpose of rubbing.

The indications afforded by a closer and more careful inspection of the skin will vary very considerably with the progress of the disease and the number of parasites present. In the early period of the attack it is sometimes difficult to discover the precise spots where the acari are at work, but a diligent search made by parting the wool here and there along the back, loins, and croup, and down the flanks, will sooner or later bring them to light. The first thing perceived will be a number of minute, red, slightly raised spots, some having upon them little vesicles or blisters, and others small dry masses of yellow or reddish-yellow exudation matter. These mark the points the parasites have punctured in search of food, and in doing so have inflamed the skin and caused an oozing or exudation of serosity. As the acari increase in

numbers and attack fresh centres, the points of inflammation, at first distinct and few, will multiply and form larger and larger patches of redness, while the discharge arising from them increasing from day to day dries into a crisp scurfy mass, and later on becomes a thick dirty-looking scab. By this means the fibres of the wool become matted together, and the fleece consequently wears a dry, staring, or broken appearance. The scabs when tested are found to adhere closely to the parts beneath, and if forcibly removed bleeding sores will be exposed on the underlying skin, and in the more severe cases small wedge-like pieces or patches of the latter slough away, leaving deep angry-looking wounds.

The more serious lesions here referred to are not altogether due to the action of the parasites, but result in a large measure from the violent rubbing which the already inflamed skin has undergone. Under the combined influence of these two causes the body becomes more or less denuded of wool, and the skin covered with thick dense scabs and painful sores. When the disease is early recognised and proper measures of treatment are adopted, the general health of the animal is but little affected. If, however, the flock is neglected, as too often happens, constitutional disturbance, more or less severe, with its attendant loss of condition, invariably results. In connection with this it should be mentioned that the effects of the disease are much more severely felt under some circumstances than others. In any case loss of rest, the result of unceasing irritation and rubbing, added to the pangs of pain and suffering caused by extensive sores, tends to interfere with feeding, to impair the appetite, and to bring about a state of emaciation and weakness.

Sheep in poor condition and insufficiently fed, and breeding ewes, especially during the later period of pregnancy and while suckling their lambs, suffer most. The very old and the very young are more readily and seriously affected in their general health and condition than the more robust adult.

DIAGNOSIS.

The foregoing symptoms portray the disease in its most characteristic aspects, and the expert, having made himself familiar with the history of the outbreak and its mode of spreading, would have no hesitation in expressing a decided opinion as to its presence. But, as Sir George Brown observes, "there are three distinct periods in the history of sheep-scab: (1) the inception, *i.e.* the transference of the acari to the sheep when detection is difficult, and perhaps at the moment impossible; (2) the developed disease when the sheep rubs and bites itself, and

nibbles at the hand of the examiner who touches the itching and otherwise shows what is the matter, and diagnosis is and (3) the end of the disease when all the acari and eggs are believed to be dead, and the inflamed skin is sound again. Once more, the diagnosis is difficult, because, in spite of the favorable signs, there may be a few acari alive, or eggs which have lost their vitality, and there is nothing to be done but wait a fortnight and watch for signs of the return of the disease. As the diagnosis may, by very simple methods, soon later, be reduced to a certainty, it is much better that it should be done, than that any doubt whatever should be allowed to remain. The scab-parasite, as we have already seen, is visible to the unaided eye, and by means of an ordinary magnifying glass its specific characters can be clearly brought out. To detect the scab mite it may be sufficient to pluck a lock of wool from the skin, and, after opening it out carefully, examine it by holding it up before a bright light. Failing in this, it should be placed on a piece of black paper near the fire, when the acari may be seen crawling over the surface.

If a microscope is at hand a considerable amount of time may be saved by resorting to it at once. For this purpose a piece of scab is removed from the skin and macerated for a short time in a solution of caustic potash, a small particle is then transferred to a slip of glass and spread out with needles into a thin layer. A drop of water and a thin glass cover are then placed over it, and the object is ready for inspection. If, in the specimen, no acari are found, fresh particles of scab must be examined. If the disease be parasitic, some or all of the characters shown in Fig. 3 will appear. A number of specimens may require to be prepared and inspected before the acari are detected, so that whoever undertakes to pursue this method of inquiry must be prepared to devote a reasonable amount of time to it, and must not indulge in hasty conclusions. It must be remembered that a scabby condition of the skin does not necessarily indicate contagious scab. Skin eruptions of a scabby nature are of common occurrence, either as the result of a too abrupt change from spare diet to a full allowance of rich, stimulating food, or as a consequence of exposure to wet after being heated and fatigued, or to the hot sun after being dipped or washed. The skin eruption following a sharp dressing for "fly" has on several occasions, in my experience, been mistaken for "scab." In none of these cases, however, does the affected animal display the severe itching and scratching so striking in the acaric disease. Moreover, the gradual spread of the latter from small point centres clearly distinguishes it from the sudden and general outburst of eruption which characterises the former.

Sheep lice (*Trichodectes spheroccephalus*), ticks (*Ixodes*), and fags (*Melophagus*), when existing in large numbers, either together or separate, provoke a considerable amount of irritation and unrest, but then there is an entire absence of those changes in the skin which distinguish contagious scab.

TREATMENT.

Unlike many of the more serious contagious diseases of farm animals, sheep-scab is eminently amenable both to preventive and curative measures, and where, by failure of the former, treatment becomes necessary, the prompt and thorough application of one or other of the various "dips" now in the market may always be relied upon to effect a speedy eradication of the disease.

To treat a flock of sheep successfully and safely without loss of time requires both intelligence and tact on the part of those who undertake it. To the average shepherd the entire business begins and ends with dipping. The presence of parasites elsewhere than on the body of the affected sheep seldom occurs to him, and the possibility of reinfection from rubbing-places and scattered locks of wool is consequently left out of account. He has no knowledge of the life history, the habits, or the vitality of the parasite, and consequently no rational inducement to take effective action. This, however, is a shortcoming for which he cannot reasonably be held responsible, and but for the woeful indifference which stock-keepers have displayed towards technical education, it could not now be charged against him.

Curative Measures.—The object of treatment will be to destroy the parasite which causes the disorder, and to restore the skin to a healthy condition. As previously explained, the scab-acarus is an oviparous creature, and, in the course of propagation, deposits its eggs upon the skin. To kill the free parasites, i.e. the adult and the young ones already hatched out, all that is necessary is to immerse them, as in the ordinary process of dipping, in a poisonous solution. This, however, while checking the progress of the disease and affording temporary relief, falls far short of effecting a complete cure, for the eggs, whose hard, impermeable shell have protected their more or less matured contents from the poisonous effects of the dressing, will still remain uninjured, and, in due course, each nest will hatch out its young brood and set up the disease afresh. Reproduction soon becomes active in the new colony, and the skin will swarm again with parasitic life. If, therefore, the disease is to be thoroughly eradicated, dipping must be

repeated, in order that the newly-born acari may be destroyed, and this should be done before they have acquired the power of reproduction, or they, like their parents, may also leave behind eggs to hatch out after the second application. To guard against this, not more than fourteen days should be allowed to elapse between the first and second immersion.

In carrying out a course of dipping it is common practice to take the sheep from the flock as they come, and to run them together again afterwards without any regard to the state of their skins. It is not generally recognised that while in the slighter cases the poison will have direct access to the parasites, in the more severe ones it may be intercepted by the thick dense scabs which afford more complete shelter and protection. In this way two or three badly affected animals may keep the disease alive, and in careless hands become a source of endless trouble and annoyance. To protect the flock from this source of possible re-infection any sheep that are badly affected with the disease should be picked out from the rest and kept together. In dipping they should be dealt with last, and for some time after the final immersion they should be kept under close observation, and, if necessary, subjected to further treatment.

Besides local treatment it will be to the interest of the farmer to uphold the general condition of the flock by liberal feeding, and if the season demands it, shelter and protection from bad weather should also be provided. Where wasting and weakness have resulted from the disease or from previous privation, the daily administration of tonic and restorative agents, such as sulphate of iron, salt, and a little liquorice powder and aniseed, will prove a useful adjunct to good living.

DIPS AND DIPPING.

The materials employed for dipping have undergone many changes in the past twenty years, during which time great improvements have been made in the elaboration of poisonous compounds, while their application has been rendered more expeditious and effective. The old method of salving or dressing the skin with mercurial ointment has well-nigh passed into desuetude. At the best, it was a costly, time-consuming, and uncertain remedy; while, in inexperienced hands, it was a dangerous one.

Dipping or immersing the entire body in a watery solution of some poisonous compound is the method now in general use both in this country and abroad, and when properly carried out is the safest and most effective. Arsenical preparations and tar products, of which carbolic acid is the chief, are the

best remedies to use, and on the score of efficiency and economy cannot be surpassed. For many years sulphur and lime, and sulphur and tobacco, were the chief ingredients employed on the great sheep farms of our colonial possessions; but these and other mixtures are fast giving way to arsenical and carbolic dips, large quantities of which are exported from this country every year.

It used to be the custom with English flock-masters, as it is now with many colonial farmers, to prepare their own "dip"; but this system has for various reasons died out, chiefly because efficient compounds can now be procured at a cheaper rate than they can be prepared at home.

The quantity of dip required for each sheep will vary with the weight of wool, and the number of animals to be operated on. In dealing with large flocks one to two quarts will be required for each sheep according as the fleece is light or heavy. For small flocks, ranging from 50 to 100, a larger amount will be needed, and not less than a gallon per head should be provided. In dipping for scab there should, as far as practicable, be no interruption; the business, when once commenced, should be continued right on to the end, and every sheep of the affected group, and all others that may have been in contact with them or have run over the same pastures, should be subjected to treatment. There is a prevailing idea that the absence of scabs from the skin is a reasonable excuse for doing nothing, and that treatment is only necessary where visible effects of the parasite appear. It requires, however, but a small measure of intelligence to understand that while it may be possible to affirm the entire absence of skin disease, it is quite beyond the power of any one to say that the fleece is free from acari, and for sanitary purposes all animals should be deemed to be infected who have been exposed to conditions which render infection possible.

If the season permits, there is a distinct advantage in clipping prior to dipping, more especially when dealing with the long-wooled varieties. It insures a more rapid and thorough soakage of the skin, and does away with the risks of failure which attach to the treatment of heavily fleeced stock, especially in the hands of inexperienced or unreliable men.

DANGERS OF DIPPING.

Whatever may be the nature and properties of the materials employed in the operation of dipping, there is always a certain measure of risk attached to it unless carried out with reasonable forethought and care, and instances might be quoted

of heavy losses resulting solely from disregard of common precautions.

When untoward results occur, the cause is often put down to the immoderate strength or dangerous composition of the dip itself; but the strong bias always present towards such a conclusion should not be permitted to exclude from consideration other possible causes of mishap, of which there are not a few.

To guard against these dangers it is of importance that a fine dry day be chosen for the work, and if it has to be done in the winter season, as sometimes happens, severe frosts should be carefully avoided.

Dipping in rainy weather not only tends to weaken the effects of the dressing by diluting it, and washing it off the fleece, but entails the further risk of dangerous contamination of the soil, and of the herbage, by poisonous matter.

Serious losses have from time to time arisen from the consumption of grass poisoned in this way, especially when sheep have been transferred at once from the dipping-tub to the pasture, and the danger, always great, will be increased if the enclosure is small. To guard against accidents of this kind the sheep should be allowed to drain on some bare ground or in pens set up for the purpose before being liberated.

In dipping unshorn sheep the wool will require to be well parted and "worked," so that the dip may thoroughly soak into it and destroy the wandering parasites.

The period of immersion will vary somewhat with the weight and texture of the fleece and the thickness of the scab. In long-wools a little extra time may be profitably spent in opening out the wool, and it is especially important that the scabs be well broken up by the hand, so that the dip may get into and beneath them. It is neither necessary nor desirable to tear them off as is sometimes done, but it will suffice to break and loosen them, so that the dressing may enter and do its work.

Dipping sheep which are heated and fatigued is much to be condemned at any time, and in the colder seasons of the year has been the cause of a considerable amount of sickness and loss, which a little care and forethought might have prevented. Instead of driving the flock long distances, or hurrying them to the dipping ground on the morning when the work is to be done, they should be pastured or folded near at hand the previous day, when they will come cool to the tub.

A few hours fasting prior to dipping is a desirable precaution to take at all times, but particularly so when dealing with fat heavy sheep and ewes in lamb.

It is important to note that as the work proceeds there will be a tendency for any undissolved portion of the mixture to

avitate to the bottom of the tub, while much of the fluid is being carried away by each animal immersed. To guard against any undue concentration from these causes repeated stirring would be resorted to, and when needful the loss of fluid by vaporation and removal should be compensated by the addition of a suitable quantity of water. In all cases where a stoppage is made for meals, or on any other account, the fluid should be well stirred before work is resumed.

Although dipping is the most expeditious and efficient mode of dressing sheep, there are occasions when such a process is, to say the least, undesirable, and may be even dangerous. This is so in dealing with ewes advanced in pregnancy. In such cases, repeated "pouring" or "sprinkling" must suffice to keep the disease in check until the more radical method becomes permissible.

After treatment, the infected flock should not be allowed to return to the field which they occupied before dipping. If, as sometimes occurs, this cannot be avoided, owing to restrictions imposed by the local authority or for other reasons, then, previous to the sheep being admitted, all locks of wool on the ground, the hedgerows, and the various rubbing places should be at once collected and burned. Moreover, the fences should be lightly rimmed where the wool has hung from them, and the posts, rails, hurdles, &c., used as rubbing places, will require to be thoroughly dressed with "dip" of double strength, and redressed again in eight days, and again at the end of a fortnight.

Notwithstanding all that can be done in this way there always remains the possibility that some parasites may escape destruction and re-infect the flock. Every effort, therefore, should be made to give the sheep a change of place after dipping, and inspectors under the Contagious Diseases (Animals) Act should afford every reasonable relaxation of the restrictions so that this may be carried out.

After the work of dipping has been completed, anything that remains of the poisonous mixture should be buried, and all utensils employed in mixing or that have been otherwise contaminated should be thoroughly scalded with a strong solution of potash or soda, before being used again for any other purpose.

MORTALITY AND LOSS.

The death-rate resulting from sheep-scab is not very great in this country. It is liable to considerable variation, however, depending for the most part on the strength of the flock at the time of infection, the season of the year, and the manner in which the sheep are fed. Flocks allowed to run down in

condition, as is too frequently the case, seldom emerge from an attack of this disorder without the loss of some of the more weakly members, and the serious impoverishment of others.

In the autumn and winter months, when cold winds and drifting storms of rain and snow prevail, the debilitating effects of the disease become very apparent. The greatest mortality occurs in mountain sheep, and especially in some parts of Wales where scant living, exposure, and neglect, make them an easy prey to the ravages of the parasite. The loss, however, by death represents but a small item in the general account. Where the disease is allowed to establish itself and to involve large numbers of sheep, the shrinkage of flesh, especially in feeding animals, is a serious item. To this must be added the loss resulting from delay in marketing and consequent waste of food and labour, to say nothing of the general upset in the balance of health and tardy recovery of condition. Besides, in the case of breeding ewes, there is the further damage which arises from abortion and premature birth, or from the production of small ill-nourished weakly lambs, which are not always an unmixed blessing to the farmer. To this must be added depreciation in the value of the fleece, caused partly by diminished growth, and partly by the mixing of the ends of the old wool with those of the new. Add to these items the cost of treatment, disarrangement of farm work, and delay often imposed on stocking and cropping by the imposition of restrictions on movement. The loss on an outbreak of sheep-scab totals up to a pretty round sum, and yet there are those, as we know, who have coolly watched its progress and ravages from week to week, and month to month, without so much as an effort to suppress it. Cruelty to animals in its worst form may sometimes be seen in the neglect of sheep suffering from this disease. It is no rare occurrence to find animals in infected flocks emaciated to the last degree, covered with festering sores from head to stern, worn down by loss of rest, and almost denuded of wool. Surely a sense of humanity might be roused in these people, and the cause of suppression materially served by an occasional prosecution, with which every right-thinking sheep farmer would heartily sympathise.

CAN SHEEP-SCAB BE ERADICATED?

Common experience teaches that no contagious disease is more capable of complete eradication than sheep-scab. It is curable by well known agents which are always accessible, and by methods quite within the range of ordinary intelligence, while

the knowledge of the life history, habits, and vitality of the parasite renders prevention for the most part a mere matter of common precaution and care; notwithstanding all this, and the total exclusion of foreign sheep from our market, the disease is as rife to-day as it was twenty years ago.

That the protection of our flocks from this ailment is not beyond the power of our flock-masters is attested by its unknown presence in many large sheep farms, and its entire absence for years in certain districts and counties. Indeed, if there is one thing more clearly indicated than another, it is that for the most part sheep-scab owes its large prevalence and persistence to the unardonable indifference and neglect which a certain class of farmers and dealers display towards the animals affected by it. So long as this state of things prevails there can be little hope of eradicating it without some concerted action on the part of local authorities and the full exercise of powers vested in them under the recent order of the Board of Agriculture. Various suggestions have been made from time to time by agriculturists and others with the laudable object of freeing our flocks from this shameful pest, but all have been wanting in the main elements of success. Among others, compulsory dipping has recently been pressed upon the Minister of Agriculture by a powerful deputation in the sheep interest; but Mr. Long, while recognising the benefits which would result from the universal adoption of such a measure, saw, as well he might, the serious practical difficulties which stand in the way of enforcing it with reasonable prospect of success. This idea appears to have arisen out of the results obtained by its adoption in Australasia, but surely it would be the height of absurdity to legislate for Great Britain on the basis of conditions existing in that far-off colony where sheep life, sheep trade, sheep traffic, and sheep husbandry generally have little or nothing in common. The flocks of this country are numerous and comparatively small; while in Australasia they are comparatively few and numerically large. Here they are constantly being forced to maturity and fatness under a system of high pressure, and put on the market in smaller or larger instalments week by week, or month by month, and replaced again by stores, which are also in consequence a shifting population. It is this exceptional activity, this ever recurring in-coming and out-going which bars the effectual application of such measures here, as might be successfully applied to the more stationary colonial flocks. Suffice it to say, that compulsory dipping, as a means of stamping out sheep-scab in this country, is an impossible measure, which no responsible Minister, with any knowledge of our sheep trade and traffic, would sanction or encourage

With such powers as local authorities enjoy under the Sheep-Scab Order, nothing would seem to be wanting to render legislative measures effective but efficient organisation and mutual co-operation. In this connection local authorities should keep their respective counties well posted with notices setting out the provisions of the Sheep-Scab Order, and drawing attention to the penalties arising out of their contravention.

All police officers should be made inspectors under the Act (where that is not already done), and instructed to notify to the local authority any suspicious appearances occurring in flocks which come under their notice.

Sheep brought together in markets and fairs should undergo a close and prolonged inspection by a qualified veterinary surgeon, who should receive a fee adequate to the services required of him, and not, as is too frequently the case, a mere acknowledgment. In the more extensive sheep fairs, two or more such inspectors should be appointed, so that the work may be efficiently carried out.

When an outbreak of scab is discovered on a farm or in a market or fair, the local authority in whose district it appears should promptly notify the fact to the Clerks of the Councils of adjoining counties and to borough authorities, who should in turn inform their veterinary inspector of the name and addresses of the person notified for present or future reference, and to any other local authority out of whose district the infected animals may have been moved. This interchange of notification and mutual advice would often furnish material for useful regulations and guidance in the affairs of sanitary police, both in connection with scab and other contagious disorders to which it might be applied. With regard to the more seriously infected areas, of which Wales is the worst, adjoining counties might exercise salutary influence by prohibiting movement of sheep into them save under a certificate from a veterinary surgeon, stating that they had been twice dipped in some efficient compound within an interval of fourteen days during the preceding three weeks.

County and borough magistrates, many of whom are also members of County Councils, should be reminded that offences against the provisions of the Act are serious, and in many instances are committed with a guilty knowledge, and should be dealt with accordingly. If those who are unscrupulous and indifferent once realise that local authorities and the magistracy are interested in the eradication of this disease, we shall soon see a diminution in its prevalence to that vanishing point where the Minister of Agriculture might reasonably be asked to give it the finishing stroke.

ACTIVE PREVALENCE OF THE DISEASE IN COUNTIES OF ENGLAND,
SCOTLAND, AND WALES FOR THE FIVE YEARS 1892 TO 1896
INCLUSIVE.

Counties with 1,000 outbreaks and over :—

York	1570
Merioneth	1293
Monmouth	1264

Counties with 800 outbreaks and over :—

Cumberland	871
Denbigh	869

Counties with 600 outbreaks and over :—

Lancaster	602
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Counties with 400 outbreaks and over :—

Montgomery	587
Carmarthen	486
Glamorgan	420

Counties with 200 outbreaks and over :—

Carnarvon	375
Westmorland	376
Hereford	363
Cardigan	351
Chester	338
Brecon	306
Durham	279
Lincoln	258
Salop	232
Derby	227
Anglesey	219
Gloucester	213
Kent	208

Counties with 100 outbreaks and over :—

Northampton	195
Flint	163
Worcester	159
Warwick	150
Leicester	129
Bucks	123
Notts	122
Bute	122
Aberdeen	116
Somerset	114
Norfolk	101

Counties with 50 outbreaks and over :—

Radnor	99
Ayr	99
Stafford	98
Sussex	87
Perth	86
Argyle	86
Moray	81
Pembroke	80
Oxford	61
Hants	50
Fife	50

Counties with under 50 outbreaks:—

Banff	49
Devon	44
Wilts	42
Essex	40
Dumfries	35
Lanark	34
Surrey	28
Midlothian	24
Rutland	23
Bedford	23
Hunts	22
Hertford	21
Cambs	20
Berwick	20
Caithness	16
Dumbarton	16
Middlesex	15
Berks	12
Suffolk	10
Haddington	9
Kirkcudbright	9
Forfar	7
Cornwall	7
Kinross	6
Kincardine	4
Inverness	1
Dorset	0
Clackmannan	0
Cromarty	0

II.—*Farm Seeds: their Quality and Examination.* I

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THERE are few farmers who have not, at one time or another, had to complain of the imperfection of the seeds which they have sown. In many instances, the failure of the seed to produce a clean and profitable crop can be traced either to imperfect cultivation, unsuitable preparation and management of the seed-bed, or to adverse climatic conditions. Other cases are, however, met with in which the seed itself is at fault, and experience has shown that, in the majority of such cases, the failure, trouble, and expense entailed could and would have been avoided if the farmer had made a careful examination of the sample before using it.

[The figures illustrating this article are borrowed by permission from the Author's forthcoming "Text-Book of Agricultural Botany," to be published Messrs. Duckworth & Co., 3, Henrietta Street, Covent Garden, W.C.]

should be the aim of every practical farmer to make himself acquainted with the peculiarities of all the seeds he has, and be able to satisfactorily examine samples for himself. Relatively few appliances and but little skill are necessary for this.

The apparatus necessary for the examination of farm seeds is: (1) a good pocket lens with two or three powers; (2) a pair of steel forceps; (3) a few sheets of white blotting paper; (4) two or three pieces of white flannel. The first two are procurable at most opticians. By means of the lens the smallest seeds can be picked up and handled for examination. In using the lens the glass should first be placed close to the eye, and the object to be looked at should be then moved nearer and nearer to the glass until it can be seen clearly; a common practice of first placing the glass near the object and then looking through it from a distance should be avoided. Blotting paper and flannel are required for testing the moisture of the seeds, as will be subsequently explained. Without entering into unnecessary details, it is proposed to draw attention to the chief general features of seeds, so that a working knowledge of the true agricultural value of any seed may be easily obtained.

PURITY.

One of the most obvious queries which should arise in our mind before purchasing seeds is, "Is the sample pure?" Any seed which is not the seed we require must be looked upon as impure, and its presence needs careful consideration, both as to its amount and its nature.

In some instances the impurity consists of the husks, chaff, and pods, and other useless parts of the plant, or of dirt, which should have been removed after thrashing. Samples containing impurities of this class are objectionable, because the farmer pays for rubbish at the same rate as for good seed.

Many samples, moreover, contain the living seeds of weeds, these are far more objectionable, because they frequently are troublesome pests in the crops among which they spring. Such impurities are of serious import, and all samples should be examined for them, and their nature determined. As a little objection need be raised in regard to the presence of impurities which produce plants of equal agricultural value to that of the genuine seed, as, for example, alsike seeds in a sample of red clover; but even a small percentage of obnoxious seeds requires very careful attention and consideration, and what appears at first sight to be a small impurity is often in

reality an important one, capable of causing serious trouble and entailing great expense. For example, two per cent. of—say, dock or plantain—seeds in a sample of red clover means, when 16 lbs. of such a sample are sown per acre, twelve or fourteen of these weeds to every square yard of the field. More than once I have seen grass and clover leys overrun and much reduced in value by weeds sown with the seed, and every farmer throughout the country has had plenty of experience of similar cases. In practically all these instances a moderate amount of careful examination would have detected the dangerous impurity.

The larger seeds, such as beans, peas, vetches, with most of the cereal grain grown upon clean land, rarely have many weeds in them, and are so readily cleaned that they are usually met with pure, or practically so. Moreover, the impurities are so readily detected by casual inspection, that the farmer has only himself to blame if he sows samples containing pernicious weeds, or if he purchases improperly cleaned seeds of this class.

With samples of the smaller seeds it is, however, different. Many of them, such as the clovers, are certain to contain impurities owing to the method of their cultivation and growth, and unless great care is exercised in thoroughly cleaning the samples, before the final thrashing, the seeds of weeds, in greater or smaller amount, will always be left in them.

Most grass seeds are liable to be impure. A large quantity is imported into this country from districts where it is hand-collected in woods, meadows, and pastures, by women and children, who cannot be expected to be experts in distinguishing the valuable grasses from useless species, even if they were inclined to do so.

Many seedsmen take more or less trouble to clean the seeds passing through their hands, but the number of firms possessing machinery capable of satisfactory work of this kind is comparatively small. By far the larger number of so-called seedsmen are merely dealers, and until the farmer becomes acquainted with the true nature of seeds and insists upon buying samples with some kind of guarantee, he will always be subject to grievous and, in some cases, irreparable disappointment.

Besides natural impurities, which occur through the imperfect cleaning and management of the seeds on the part of both grower and seedsman, there are impurities which, without doubt, are sometimes the result of direct fraudulent adulteration. Inferior and worthless seeds are not unfrequently mixed with, or entirely substituted for, those of superior value, which they resemble in general form. Fraud of this kind, except in

one or two cases, such as the mixing of charlock seed with that of turnip and similar cruciferous plants, is usually easily detected.

There is, however, one form of dishonest practice in regard to the purity of seeds which cannot, by any means, be detected with certainty, and that is the mixing and substitution of one strain of seed for another of the same variety or species of plant. For example, no difference can be observed between the seeds of one form of red clover and another, and, consequently, seed of this crop raised abroad cannot be recognised when mixed or substituted for English grown seed; the farmer can, therefore, only depend on the honesty and uprightness of the vendor. This also applies to the purchase of so-called "pedigree" seeds of all kinds.

In order to obtain a correct quantitative estimate of the impurities in a sample of seed, experts have special sieves and other apparatus for separating them. These impurities are subsequently weighed, and the amount present in every 100 lbs. of the sample is stated in their reports.

A farmer cannot, however, be expected to go into this detail; but a good, practical, useful idea of the purity of any sample of seed can be obtained by spreading two or three hundred seeds, taken at random, out on a sheet of black or white paper and counting the number of weed seeds among them.

With the aid of a pocket lens or strong magnifying glass, and the assistance of the figures given further on, the chief seeds and the common and most objectionable impurities can be readily recognised.

GERMINATION CAPACITY.

A mere examination of the purity of a sample of seed, although of great importance, is not in itself sufficient to determine the real value of the seeds for the purpose of raising a crop. The sample may be absolutely pure and true to name, and yet be useless from the fact that the seeds composing it may all be dead. We must therefore endeavour to settle the question, "Are the genuine seeds living and capable of growing into healthy plants?"

If a sample has not been tampered with, there are certain features, such as colour, brightness, and smell, which are useful indications of the probable power of growth of its seeds; but these features are so liable to be fraudulently altered, while the proper weight to be given to them is so dependent on a somewhat extensive acquaintance with seeds generally, that it is not safe to rely upon them altogether.

As a matter of fact, no amount of external or internal examination will do more than enable one to give a shrewd guess as to whether seeds are dead or alive. The only certain means of settling the question is to make a trial of the germinating power by placing them under certain conditions of moisture, warmth, and air-supply, thus giving them a chance of manifesting their vitality.

Before explaining how to test the vitality of seeds it will be useful to draw attention to some of their peculiarities which may not be understood.

The seeds sown by the farmer, whether they be true seeds in the botanical sense, or fruits, that is, pods or cases with seeds in them, all contain a small living plant or embryo within. The embryo or plantlet at the time the seed ripens enters into a state of rest, in which condition all active processes appear to be suspended. If, however, the seed is placed in a warm, moist situation, with plenty of access to fresh air, the plantlet begins to wake up and soon escapes from its protective coats to lead an independent and separate life like the parent plant which produced it. This waking up from rest to a state of active growth is termed germination.

The time during which the plantlet within the seed can be kept in a resting condition, and yet retain its power to germinate when the seed is sown, varies according to the plant: peas, for example, retain their vitality longer than onions, cabbages and turnips longer than parsnips and carrots. Moreover, the ripeness and the way in which the seeds are stored influence the length of life of the embryo plants within the seed.

In immature seeds the embryos are not properly formed or nourished, and lose their vitality sooner than those in ripe seeds; the plantlets also die off sooner when the seeds are kept in a warm, damp place, than when stored in a cool, dry situation.

Individual instances are met with of seeds retaining their germinating power for a considerable time; but the embryos within the seeds of farm plants, even when stored in the best practical manner, will almost all be dead in less than a year, and a very great proportion of all seeds die off in less time than this.

Below is given a table indicating the length of time various seeds may be kept without much serious depreciation of their germinating capacity, but it must be strongly emphasized that the best results, so far as the farmer is concerned, are obtained from seed sown in the year following their production. Keeping the seed weakens the embryo and checks its growth in the crop, but, in some cases, where fresh new seed is

tend to produce over-luxuriant plants, somewhat old seed may be desirable. These cases are, however, more frequent in garden than in agricultural practice, and may be disregarded by the farmer.

Wheat	2 years	Mustard	3 to 4 years
Oats	2 "	Cabbage	3 to 4 "
Barley	1 to 2 "	Kohl-rabi	3 to 4 "
Rye	1 to 2 "	Kail	3 to 4 "
Maize	1 to 2 "	Rape	3 to 4 "
Peas	4 to 5 "	Mangold	3 "
Beans	4 to 5 "	Carrot	3 "
Buckwheat	2 "	Clovers	2 "
Turnip	3 to 4 "	Sainfoin	2 "
Swede	3 to 4 "	Lucerne	2 "

Dealers, no doubt, often mix old seed with new, which accounts for many of the samples in the market being of such a poor germinating standard.

The following is a simple method of testing the germination capacity of seeds, and is applicable to nearly all kinds of samples. Moisten a sheet of thick blotting-paper without making it dripping wet; fold it once and place it on an ordinary dinner plate. Take 200 or 300 pure seeds from the sample and spread them more or less evenly on the damp blotting-paper, after which cover the seeds with a single sheet of similarly moistened paper. Over the whole put another plate upside down to prevent undue evaporation, and keep in a warm room. Each kind of seed has a temperature best suited to its germination, but practically all farm seeds grow well at about 62° Fahr.

Although many seeds in the sample will germinate in a few days, and even in a few hours sometimes, the trial should be continued for—

10 days in the case of cereals, clovers, turnips, and most common farm seeds;

14 days for carrot, parsnip, mangel, rye grass, and Timothy-grass; and from

21 to 28 days for all other grasses.

During the trial the upper sheet of blotting-paper should be moved twice daily and allowed to remain off for ten minutes more at a time to give access of fresh air to the sample.

Whenever the paper becomes too dry more water should be added, but it is very important, especially with small seeds such as grasses, that the seed-bed should not be dripping wet, otherwise free circulation of air to the embryo is prevented, and the plantlet is liable to die of suffocation.

For the larger seeds, such as beans and peas, and for mangel, damp flannel or damp sand should be used as the seed-bed.

As soon as a seed has germinated it should be carefully removed and a note made of the fact, the final counting and calculation of the percentage which has germinated being made at the expiration of the above-stated times.

What is termed the *real value* of a sample may be calculated by multiplying the percentage purity by the percentage of genuine seeds capable of germination, and dividing by 100. Thus, if a sample of cocksfoot was found to have a purity of 90 per cent., and the number of separated pure seeds capable of germination was 85 per cent., the "real value" would be

$$\frac{90 \times 85}{100} = 76.50.$$

This figure represents the amount of pure seed of real use to the farmer in every hundred lbs.; that is, in this case, in a bag of 100 lbs., only 76½ lbs. would be capable of producing the kind of plant required, namely, cocksfoot.

The price of seeds should be proportional to their "real value," as calculated in the above manner from the purity and germination percentages. It will almost always be found that those which are the highest in price per lb. are in reality considerably cheaper than others offered at a lower figure.

ENERGY OF GERMINATION.

In watching the germination of two or more samples of a similar species of seed, red clover for example, it will often be noticed that although they have all germinated to the same extent at the end of ten days, yet each sample has germinated at a very different speed during that time. In some it will be found that most of the embryos made their exit from the seeds in the first two or three days, while in others they appeared much later, say, not until the sixth or seventh day of the trial. As a rule, the best samples are those which germinate most rapidly and evenly; old, weak, and inferior seed is slow in germinating.

It is useful, therefore, when testing their germination capacity, to note the number of seeds which germinate in the under-mentioned spaces of time:—

Cereals, cabbage, turnips, and other cruciferous plants	..	in 2 days
Clovers, lucerne, and other small leguminous seeds	..	„ 3 „
Timothy-grass	.. .. .	„ 4 „
Tall oat-grass, rye grasses, and meadow fescue	..	„ 5 „
Meadow foxtail, mangel, and carrot	.. .. .	„ 6 „
The smaller fescues, cocksfoot and meadow grasses	..	„ 7 „

FORM, COLOUR, BRIGHTNESS, AND SMELL.

No true or reliable estimate of the value of a sample of seed can be obtained except by an examination of its purity and germination capacity, and consequently these tests should never be omitted before sowing.

There are, however, certain external features, such as form, colour, and brightness, which are useful indications of the quality of seeds, provided the samples have not been fraudulently altered. All seeds when properly ripened have a characteristic plumpness which is evidence that the embryo is well-matured, and its store of food-material within the seed well filled. Thin shrivelled grains or seeds are often the result of their having been harvested in an unripe state, or are due to a too rapid ripening of the crop; in either case the embryo is liable to be imperfectly formed and weak, and the food-supply within such seeds is often insufficient to nourish the young plant adequately at its critical early stages of growth. It is, therefore, advisable when selecting samples to choose those of bold plump form, and especially so in the case of all true seeds, such as turnips, cabbages, beans, clover, and cereal grains. With grass seeds and seeds in the husk, such as sainfoin (*i.e.* fruits), where the true seeds are not seen, plumpness is no indication of the value of the sample, as the husk or pods may be well formed, and yet contain nothing but shrivelled seeds.

In regard to colour it may be mentioned that all seeds, when ripe and just fresh from their pods, have a distinct characteristic colour (which should be familiar to all farmers). On being kept, changes take place in the colouring matter, so that old seed can generally be distinguished from new by its tint. We need not here discuss this matter in detail, as most of the deterioration due to age is mentioned under each seed later on; but it may be noted that purple seeds usually change to a foxed or pinkish tint with age, yellowish seeds turn browner, and the dark-coloured seeds of the cruciferous plants become greyish-brown.

Unripeness is often readily recognised by the colour of the sample; pale seeds often show a greenish hue when unripe, and even the dark-coloured seeds of cabbage, turnip, and swede are paler when immature.

Many seeds which, like those of red clover, are bright and shining, become dull when old, and the peculiar odour of new seeds and fresh carrot seed disappears or diminishes with age.

Valuable as some of these external characteristics are, no absolute reliance is to be placed upon them, as the colour can readily be altered by dyes, and the general appearance of a badly coloured old sample can be relieved and improved by

admixture with highly coloured good fresh seed. Moreover, the dulness is easily changed by the application of the merest traces of oil, and any mustiness or greyness, due to damp storage, can be removed by shaking up or rubbing with charcoal powder, and by various other devices.

WEIGHT.

It has been proved over and over again that large heavy seeds give more vigorous and healthy crops than smaller ones; hence the superior crops usually obtained from so-called pedigree seed, which is often nothing more than larger seed screened off from ordinary seed by special sieves. This is naturally to be expected, for in large heavy seeds the embryos are surrounded by a greater store of food for their nutrition than in small ones.

An excellent method, therefore, of arriving at the relative value of two samples is to compare the relative weights of a certain number of seeds, say 100 or 1,000, taken from each. Moreover, weighing 100 or 1,000 seeds from samples of sainfoin in the husk and grasses will also help to determine which contains fewest empty "deaf" husks.

Unfortunately, however, this test is not a practical one for the farmer, as it involves the use of somewhat delicate and expensive balances.

PURCHASING SEEDS.

The following recommendations with regard to purchase will, if adopted, tend to reduce the cases of failure resulting from the use of bad seed.

1. *Never buy mixed seeds, especially those of grasses.* It is often impossible to determine without much trouble the exact composition of the mixture and the particular quality of each of the constituents. To purchase mixtures, therefore, tends to encourage fraud and dishonest practices.

2. *Always buy by weight or by weight per bushel, and never purchase by measure alone.* In the case of grass seed this is of exceptional importance, as the measure may be only full of chaff. The force of this recommendation is readily perceived when we observe that rye-grass, for example, in the markets varies from 15 lbs. to 28. lbs per bushel; the former light samples contain much empty chaff and immature inferior seed, while the latter weight is only obtained in the best well-ripened samples.

3. *Insist upon having written guarantees of the purity and*

ination capacity of the samples, and never sow until the seeds been examined in respect of these two points.

There are firms who will give no guarantee of any kind whatever, but they are undoubtedly unfair, and should be cautiously avoided. Firms who are not merely dealers but men, in the proper sense of the word, are willing to supply the above-mentioned terms, and as they themselves never have seeds without carefully examining them, they find it hardship to supply good seed with a definite and reasonable guarantee.

I.—CRUCIFEROUS PLANTS.

The chief plants of the farm belonging to this family are cabbage, kale, kohlrabi, turnip, swede, rape, black mustard, and white mustard.

The seeds of all these are sown for a crop, and the *germination capacity* should never fall below 90 per cent., except perhaps in the case of black mustard, which is often harvested in an unripe condition to avoid the loss of seed, and the subsequent trouble which its shed seed causes to future crops. In black mustard germination capacity may be considered good if it reaches 80 per cent.

The *purity* of cruciferous farm seeds is generally good and should not be less than 98 per cent. Not unfrequently imperfectly developed seed is present in the sample, and sometimes pieces of broken pods are left, both of which should have been cleaned off. Rarely, however, do we find obnoxious weeds present, although formerly adulteration with specially sown charlock seed was practised to a large extent. The similarity between charlock and turnip seed is such that it is possible for the farmer to detect the fraud with certainty, the presence of dead seed is readily proved by the germination test, which should never be neglected when purchasing.

(a.) CABBAGE, AND ITS VARIETIES.

The seeds of the drumhead cabbage, thousand-headed kale, kohlrabi, and all the varieties of plants derived from the cabbage, are so much alike that there is no certain means of distinguishing them. The seeds are round or oval in shape, of medium size, and brownish-grey in colour, and, unless they have been oiled, have a dull surface. Good natural samples often bear as if somewhat old and musty, but they should be free of musty odour and possess a mild oily taste.

(b.) TURNIP, SWEDE, AND RAPE OR COLE.

Swede seeds are similar in size and form to those of the cabbage, but have a brighter surface, and are a deep purple colour, almost black, when ripe; unripe samples are paler.

Rape or cole is a modified form of the same plant as the swede, and both these seeds are practically identical in external appearance. The likeness is so great that I have met with a farmer who drilled rape seed in mistake for that of swede, and did not detect the error until some time after the crop was thinned and hoed.

The seeds of the turnip are generally slightly smaller than those of the swede, and of paler purplish-red tint. Both have a mild oily taste.

No possible means exist of distinguishing the seeds of different strains of turnips and swedes, and the farmer is therefore compelled to trust to the vendor's honesty in supplying strains unmixed and true to name.

Our own experience teaches us that there is a considerable amount of old and new mixed seed in the market, especially of these cruciferous plants; and, as age has little influence upon the colour of the coats of these seeds, the practice of mixing is not so readily detected as in red clover and some other plants, where the colour of old seed is so different from that of new.

(c.) BLACK OR BROWN MUSTARD.

The seeds of this plant, while similar in shape to those of the turnip, are distinctly smaller in size, and of more uniformly purplish-red colour; the surfaces are bright, and under a good pocket lens appear covered with fine dots.

(d.) WHITE MUSTARD.

The seeds of white mustard are one and a half to twice the size of those of the black species, and are whitish or pale yellow in colour, with smooth surface. The seeds of the two mustards, and those of charlock, which in external appearance resemble brownish smooth turnip seeds, have a pungent biting taste.

II.—LEGUMINOUS PLANTS.

Some of the most important crops of the farm belong to this class of plants, the chief representatives being beans, peas, vetches, clovers, sainfoin, lucerne, and trefoil. Nothing need

be said in regard to the larger seeds, such as beans, peas, and vetches, which are usually of high purity and good germination capacity; the smaller seeds are, however, almost always very liable to be imperfect in quality, and need special and careful examination before sowing.

One of the peculiarities of leguminous seeds is that in all samples there are a larger or smaller number whose coats do not allow the free penetration of water into the interior, and consequently such seeds do not swell during the germination trials.

These are termed "hard seeds," and although the embryos within them are living, the penetration of water is so slow that germination is delayed sometimes for long periods, and the seeds are therefore practically of less value to the farmer than rapidly germinating ones. It is usual to consider one-third of the "hard seeds" in a sample as useful.

(a.) RED, OR BROAD CLOVER.

This plant occupies the premier position among forage plants on account of its high feeding value and productive power. Besides the seed grown in this country a large amount is imported from various parts of the world. Experience and trial of specimens upon experimental plots has made it abundantly evident that there is considerable difference in the behaviour of imported seeds, not only in regard to their resistance to frost and yielding power, but also with respect to the hardness of the plants produced by them. Clover seeds harvested in the southern parts of Europe, and the warmer states of North America, always produce plants of delicate constitution, incapable of resisting our winters with anything like certainty. Seed raised in the northern parts of France, and in central Germany, are hardy, and parcels imported from Canada are usually good. There is, however, no doubt that the best seed for this climate is that which is home-grown and is the produce of plants of a hardy stock, and not merely English grown from recently imported American or South European seed.

Against the substitution of foreign for English seed, or the mixing of foreign seed with English produce and selling the whole as English pure and simple, there is no check which the farmer can employ. There are no means of distinguishing foreign from home-grown seed, but the presence of weed seeds not indigenous to this country in the sample creates suspicion, and a consequent recommendation to avoid such parcels. In the purchase of this seed the farmer is entirely in the hands of the seedsman.

Red clover seeds have the form given in Fig. 1. They should be plump with a clear shining surface. The colour is not the same all over the seed, the broad end being deep rich purple, which shades off into a pale yellowish-grey at the opposite ends. In all samples there are some seeds which are almost uniformly yellow all over, but these should be comparatively few in number. The best, most vigorous, and well ripened samples are those in which the proportion of rich purple seed is highest; in unripe ones the presence of unopened pods, with seeds inside, is frequently noticeable, and the yellow seeds in immature samples sometimes exhibit a greenish tinge.



Fig. 1.—Seed of Red Clover.
(Ten times natural size.)

The colour of red clover seeds changes with keeping from a purple to a pinkish-red, and the lighter parts assume a buff or foxy-red tint: the presence of old seed in mixtures of new and old is readily detected by careful examination with a pocket lens.

The *germination capacity* of good samples is often as high as 98 per cent., except in wet seasons. From 8 to 10 per cent. of hard seeds is commonly met with. It is in *purity* that the farmer often fails to obtain value for his outlay, and we would recommend the rejection of all samples which contain less than 95 per cent. of pure seeds. In well-cleaned seeds it is often 98 per cent., and there should be no difficulty in obtaining seeds of this state of purity from good firms.

A very large number of different kinds of weed seeds have been observed in samples of red clover, but the following are the most objectionable, and can be easily recognised with the aid of a pocket lens from the figures here given.

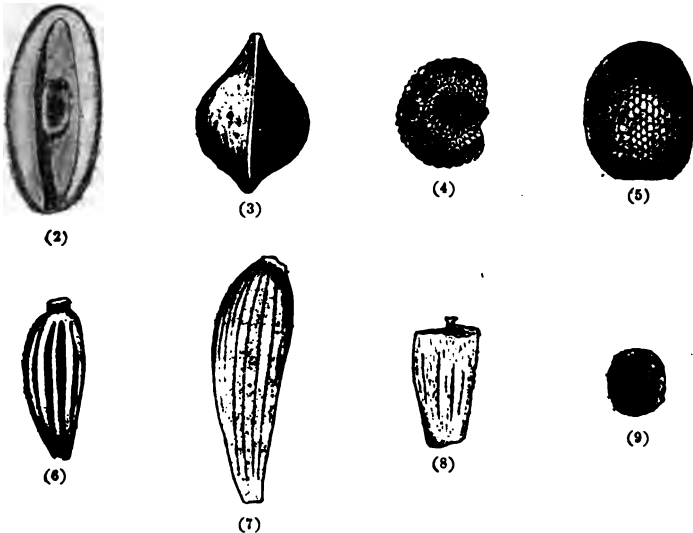
Narrow-leaved plantain seeds are often met with; they are very similar in colour and form to a date stone (Fig. 2).

All the docks have triangular seeds, varying a little in size according to the species; they are a rich chestnut-brown colour, with smooth shining surfaces.

Cranesbills are objectionable plants with small pale purple or pink flowers, and a dense rosette of leaves close to the ground, which smother out all clover plants near them. The seeds of the species most common in red clover are roundish with deeply cut edges. Dove's foot cranesbill seed is chocolate-brown, and covered with a kind of network; round-leaved cranesbill is egg-shaped, smooth, and reddish-brown in colour (Fig. 11).

Nipplewort is a plant, from two to three feet high, with broad stalked leaves and a number of small yellow flowers on a branched stem. The flowers are similar to miniature dandelion

seeds. The seeds are flattish and curved, of the form given in Fig. 7, and of a pale brownish-yellow tint. Ox-eye daisy (Fig. 6) and field chamomile (Fig. 8), both of which have daisy-like flowers, are frequent impurities of red clover seeds. White and redampions are weeds growing from two to three feet high, with broadish tapering downy leaves, and white or pink flowers about an inch in diameter; the seeds of both are somewhat kidney-shaped, greyish in colour, and covered with numerous wart-like projections (Fig. 4). Yellow trefoil seed (see Fig. 18) is also an impurity of red clover.



Common impurities met with in samples of Red Clover and other seeds.

- | | |
|-----------------------------|----------------------|
| (2) Narrow-leaved Plantain. | (6) Ox-eye Daisy. |
| (3) Species of Dock. | (7) Nipplewort. |
| (4) White Campion. | (8) Field Chamomile. |
| (5) Dove's Foot Cranesbill. | (9) Clover Dodder. |

(All ten times their natural size.)

The most formidable pest of red clover leys is dodder, which is, however, less frequent than formerly, on account of the superior methods of cleansing seeds. Nevertheless, foreign and dirty samples are sometimes sold cheaply, and I saw several bad sacks of this pest last season. The seeds of dodder (Fig. 9) are much smaller than those of red clover, and there is no excuse for their presence, as they are most easily separated by simple sifting through proper sieves. They are roundish, sometimes slightly angular, of brownish-grey colour with rough surfaces. They closely resemble pieces of clay or earth, but are easily distinguished therefrom, for, on pressing with a knife, they crumble.

(b.) ALSIKE, OR SWEDISH CLOVER.

These seeds are smaller than those of red clover, and heart-shaped, with smooth surface, marbled with light green patches (Fig. 10). Old seed is reddish, while immature samples are a yellowish-green tint. Seeds of this plant when old were formerly dyed, and possibly now the practice is indulged in occasionally, although I have not met with a case. Dyed seed, when rubbed in a damp handkerchief, is said to leave a stain.

The *germination capacity* should be about 95 per cent., and the *purity* from 96 to 98 per cent.

The commonest impurities are the same as those usually found in red clover, especially small dock, ox-eye daisy, dodder, and round-leaved cranesbill (Fig. 11); but two other impurities are frequent, namely, the wild pansy and self-heal. The wild pansy possesses a yellowish-brown, somewhat flattened seed (Fig. 12), and the self-heal, which is a plant growing from six to eight inches high, with short heads of blueish flowers, has an oval seed of rich chestnut-brown colour, with a white triangular point at one end (Fig. 14).

(c.) WHITE, OR DUTCH CLOVER.

The seeds (Fig. 13) of this plant are similar in size and form to those of alsike (Fig. 10). The surface is smooth, and fresh samples are generally of a pale bright-yellow colour, though seeds of a yellowish-brown tint are also met with. When immature, a greenish-yellow tinge is visible, and in old seed the colour is pale brick-red.



Fig. 10.—Seed of Alsike Clover.



Fig. 11.—Seed of round-leaved Cranesbill.



Fig. 12.—Seed of field Pansy.



Fig. 13.—Seed of White Clover.



Fig. 14.—Seed of Self-heal.

(All ten times their natural size.)

The *germination capacity* and *purity* in the finest samples are each about 98 per cent., with from 10 to 15 per cent. of hard seeds. The weeds commonly observed are the same as those met with in alsike and red clovers.

The seeds of yellow suckling clover are used to adulterate white clover, but the fraud is readily detected, as the seeds are very small, of oval shape (Fig. 15), with very bright shining greenish-yellow surfaces.

(d.) "TRIFOLIUM," OR CRIMSON CLOVER.

The seeds of this clover are of a regular oval shape (Fig. 16), and larger than any of the other cultivated species. The surface of fresh good seed is very smooth, and of reddish-yellow tint. The *purity* and *germination capacity* is generally high, being from 96 to 98 per cent. each.

(e.) LUCERNE.

On account of the peculiar form of the pod and the method of packing, the seeds of lucerne are irregular in shape and wanting in that plumpness so characteristic of red clover. Two common forms are given in Fig. 17, they are usually longer than red clover seeds, and have *dull* surfaces of yellow colour inclined to pale buff; when old the seeds darken and change to a yellowish-brown tint.



Fig. 15.—
Seed
of Yellow
Suckling
Clover.



Fig. 16.—Seed of
Crimson Clover.



Fig. 17.—Two commonest forms of
Lucerne Seeds.

(All ten times natural size.)



Fig. 18.—Seed
of Yellow
Trefoil.

The *purity* and *germination capacity* should be from 95 to 98 per cent. An impurity of common occurrence which should always be looked for, as it is generally an adulterant, is yellow trefoil, the seeds of which are described below. Dodder is also occasionally met with.

(f.) YELLOW TREFOIL, "NONSUCH" CLOVER, OR BLACK MEDICK.

The seeds of this plant (Fig. 18) are slightly smaller than those of lucerne, but plumper, and never kidney-shaped, as some of the latter are. The colour is pale buff or greenish-yellow, and the surface is brighter than that of lucerne seeds.

On one side is a small projection, which is missing from lucerne, and, on looking at the edge, the whole seed appears straight, whereas in lucerne the seeds, when viewed in the same manner, appear bent and irregular. The *purity* and *germination capacity* should each be from 96 to 98 per cent.

(g.) SAINFOIN.

In some cases true seeds (milled seeds) are sown for the production of a crop of sainfoin; but more frequently the pods are sown, each of which contains a single seed.

Samples of milled seed *should be quite pure*, and possess a *germination capacity* of about 90 per cent.

The true seeds are shaped like a bean, a little over an eighth of an inch long, and of yellowish olive-brown tint; dark seeds are either old, or spoilt by rain.

The husk or pod is half-moon-shaped, and covered with a raised network, on which are pointed projections; good samples are of a brown colour, while those which are unripe are yellowish-green.

The commonest and most objectionable impurity in "unmilled" samples of sainfoin is burnet, the "seeds" of which are smaller and four-winged, with rough projecting points between the wings. Imported seed invariably contains this impurity, which is difficult to separate from the sainfoin; such samples should not be sown, as the weed spreads and smothers the crop. To totally avoid the weed, "milled" seed may be used with advantage.

The *germination capacity* of "milled" seed is low, on account of the difficulty of separating the pods containing abortive seeds; a sample may be considered very good if its germination capacity reaches 80 per cent.

III.—UMBELLIFEROUS PLANTS.

Of these we have only two cultivated species on the farm, namely, the carrot and parsnip. In both of them the flowers are very minute, and so crowded together in umbels that the perfect development or ripening of all the seeds rarely happens. The commercial samples of these seeds are, therefore, almost always of low germination capacity, and are often very imperfectly cleaned from the broken fragments of the slender flower stalks and other parts of the umbels. Moreover, the embryos within the seeds of umbelliferous plants die rapidly on being kept, and seed a year or two old has a very diminished vitality. The parts of the plant sown for a crop are not true seeds in the botanical sense, but the halves of the ripened fruits, each of which contains a single true seed.

(a.) CARROT.

The commercial "seeds" are oval: one side is flat, the other being rounded, and having on its surface four rows of spiny

projections, which become entangled in such a manner that the seeds cling to each other, and cannot be sown or drilled evenly unless previously mixed and rubbed with fine sand, dry earth, or ashes, in order to separate them and keep them apart.

In fresh new samples the seed has a greenish tint and a distinct and characteristic aromatic odour, which gradually disappears from old seed.

The *purity* is always good, so far as the presence of weed seeds is concerned, but generally the cleaning is imperfectly done, and too many fragments of useless chaff are met with in samples. The *germination capacity* is rarely higher than 60 or 70 per cent.

(b.) PARSNIP.

The "seeds" of this plant are thin and flat, oval or roundish in outline, and greyish-yellow in colour when fresh. On one side are two dark lines; the latter are hollow canals, filled with a brownish oily substance, which gives the seed an aromatic odour when fresh. The remarks upon the *purity* of carrot seed are also applicable to the parsnip.

The *germination capacity* of commercial samples is, as a rule, extremely bad, owing, no doubt, to the seed being often kept some time before being sold. A germination capacity of 50 per cent. may be considered very good.

IV.—GOOSE-FOOT FAMILY.

To this family belong several weeds, but the only cultivated plant of the farm included in it is mangel, and its relative, sugar-beet.

MANGEL.

The flowers of the mangel grow in clusters, arranged at short intervals upon long spikes. From two to seven flowers form a cluster, and, as each flower gives a single seed, the clusters contain a variable number of seeds—usually three or four. The hard parts of the flowers containing the seeds are, when ripe, so closely united to each other that when thrashed the clusters fall off almost whole.

A single commercial mangel "seed" is therefore a compound structure or cluster containing several true seeds, each capable of becoming a young plant. On germination, two or more seedlings may spring up very close together and interfere with each other's development; hence the need of the special thinning which this crop receives.

The *purity* is generally good. The *germination capacity* should not be less than 150 or 160 per cent. It has been found that the best seed is that which is composed of medium-sized clusters.

V.—GRASSES.

Commercial samples of the seeds of grasses are more liable to be impure and of poor germinating capacity than any others with which the farmer has to deal. Moreover, the distinguishing features of the different kinds of grass seeds, and their impurities and adulterants, are so small that they cannot be seen with any degree of clearness or certainty with the naked eye, and therefore the chances of being misled by the general outward appearance of the sample is greater when dealing with this class of seeds than with any other. A good pocket-lens, however, is amply sufficient to enable one to decide with certainty as to the genuineness and purity of any sample, with the exception of one or two species, which must be examined under the higher powers of the microscope.

Before describing the characteristic features of the different kinds, it is necessary to become acquainted with the arrangement and nature of the parts of a grass seed, and, for convenience of description, one or two botanical terms must be explained.

The actual flowers of a grass, from which the grain and the true seed within is developed, are hidden from view between two small chaffy leaves called *glumes*. One of the latter, usually the larger, is termed the *flowering glume*, and the other, usually the thinner and smaller of the two, is spoken of as the *pale*. The flowers, with their accompanying glumes, are arranged on a short kind of stem, called the *rachilla*, the whole with two *empty glumes*, forming a longer or shorter spike of flowers, termed a *spikelet*. All grasses have their flowers in spikelets, and a typical one with its parts is illustrated in Fig. 19.

When a spikelet containing several flowers has become ripe, or is thrashed, it generally falls in pieces, in the manner shown in Fig. 19, and the separate parts, consisting of flowering glume and pale, with the grain between them and a piece of the rachilla, come into the market as "grass seeds."

Foottail and a few other grasses contain only one or two flowers in each spikelet, and these fall off the plant whole, and are sold as the "seed."

The only part of a grass seed of any use is the grain within the glumes, as this contains the young plant. In immature samples, the embryo plant and the grain are often poorly developed, while in over-ripe samples the grain easily falls out

of its enclosing chaff, and is lost in rough handling; in the latter case much empty useless chaff is present.

An estimate of the amount of empty chaff in a sample may be obtained in the following manner:—Take two or three hundred “seeds” and spread them on a small sheet of glass, then place another sheet of glass over the “seeds” and hold the whole up to the light. The empty chaff appears uniformly semi-transparent, while in complete seeds the dark figure of the grain can be seen through the glumes.

In examining grass seeds for their genuineness and the nature of their impurities, attention must be paid to the shape and position of the bristle-like “beard,” or *awn*, which springs from the flowering glume, the form, length, and position of the

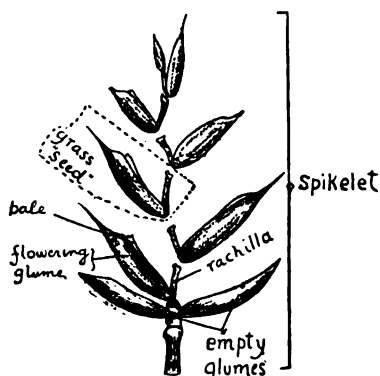


Fig. 19.—Spikelet of a grass, showing its various parts, and usual manner of separation when ripe.

rachilla and the smoothness or hairyness of the glumes, for these are the only features by which one grass seed can, with any degree of certainty, be distinguished from another.

(a.) SWEET VERNAL-GRASS (*Anthoxanthum odoratum*, L.).

The seeds of this grass have two outer glumes of rich, dark chestnut-brown colour, covered with fine silky hairs. The tips of these glumes are pale in colour, and from the back of each arises an awn; one of the two awns is straight, and the other twisted and bent (Fig. 20).

Good samples with a high germination capacity are rare, as the grains are very apt to fall out of the glumes if roughly handled. Samples with from 60 to 70 per cent. of living seeds may be considered good.

Puell's vernal-grass is often supplied in place of this seed,

or largely mixed with it. This is a useless *annual* grass, the seeds of which appear lighter coloured than sweet vernal seeds when seen in bulk, on account of their glumes being covered with paler hair; in other respects the two are very much alike. Sweet vernal-grass, however, is of so little use that farmers would do well never to use it in mixtures.

(b.) MEADOW FOXTAIL (*Alopecurus pratensis*, L.).

The outer glumes of these seeds should be greyish-brown on one side and paler on the other; they are fringed along the midrib with long silky hairs, and united by their edges from the base to a point below the middle of the seed (Fig. 21). The



Fig. 20.—Seed of Sweet Vernal-grass.



Fig. 21.—Seed of Meadow Foxtail.

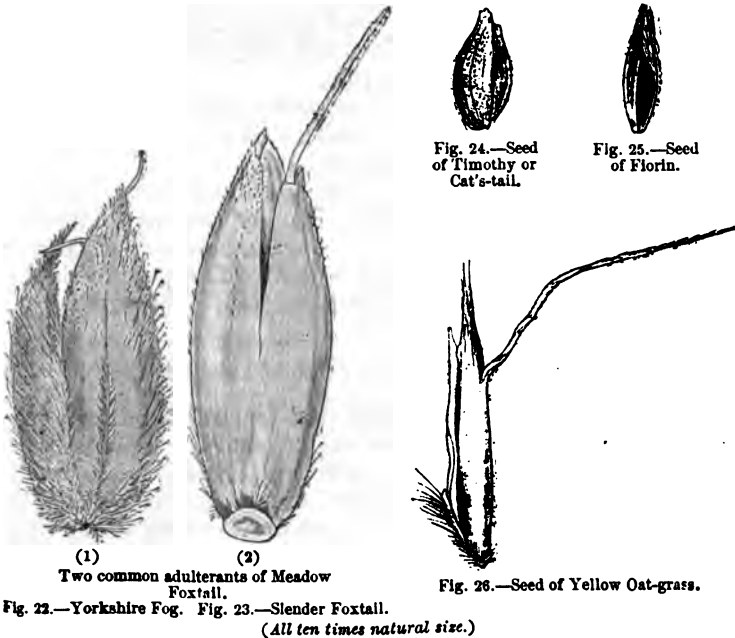
(Both ten times natural size.)

flowering glume within possesses a long bent awn, which protrudes from the tip of the seed. The seeds, when thoroughly ripe, easily fall off the plant. To avoid this loss, large amounts are gathered by hand much too soon, and the germinating capacity of most of the samples in the market is consequently poor. Samples possessing 60 per cent. living seeds may be considered good.

Much adulteration is practised with foxtail, the commonest impurities introduced being seeds of Yorkshire fog and slender foxtail, both obnoxious weeds. They are readily recognised by

he figures (Figs. 22 and 23). Yorkshire fog seeds are paler in colour, and the empty glumes more hairy; while the awn attached to its flowering glume is smaller, and usually bent like a fish-hook.

Slender foxtail seeds are similar in shape and colour to those of meadow foxtail, but are slightly larger, not so hairy, and harsher to the touch; the glumes are united from the base up to a point near to or above the middle of the seed (Fig. 23). Rye-grass seeds are sometimes added to foxtail samples to increase their weight; the fraud, however, is readily detected, as the impure seeds are altogether different from the genuine ones (see Fig. 38).



(c.) TIMOTHY OR CATS'-TAIL (*Phleum pratense*, L.).

The seeds of this grass are small (Fig. 24), and have very thin semi-transparent glumes, with a silvery-white lustre. The grain within the glumes should be pale brown in colour, when dark brown it is likely to have been badly harvested and its germination capacity injured.

Good samples of Timothy germinate to the extent of 90 per cent., and are almost always pure.

Impurities to be looked for are seeds of small docks (Fig. 3), field pansy (Fig. 12), plantains (Fig. 2), and self-heal (Fig. 14).

(d.) FIORIN (*Agrostis alba*, L. var. *stolonifera*).

True seed (Fig. 25) of this grass is rarely, if ever, met with in the market, and as the plant is valueless in ordinary farm practice, it is needless to do more than mention its name.

(e.) GOLDEN OAT-GRASS (*Avena flavescens*, L.).

The glumes of this seed are of a pale brownish, straw colour. From the back of the flowery glume, at a point more than half way from the base of the seed, arises a bent twisted awn (Fig. 26). The rachilla bears many long white hairs upon it, and juts out slightly from the pale.

The germination capacity is low, as the empty chaff is difficult to clear away from the good seed; if it reaches 50 or 60 per cent. the sample may be passed as good.

A common adulterant is the worthless wavy hair-grass (Fig. 27), the seeds of which closely resemble those of golden oat-grass. The impure seeds are, however, darker, and the awns upon them rise from a point quite close to the base of the seed, instead of high up on the back of the glume.

(f.) CRESTED DOG'S-TAIL (*Cynosurus cristatus*, L.).

The flowering glume of this seed is stiff and drawn out at the tip to a strong point. The upper part of the glume bears a number of stiff palish short hairs or bristles, and is orange-yellow, its base being smoother and dark brown (Fig. 28). The germinating capacity should not be less than 65 or 70 per cent., and it is not difficult to procure very pure samples.

Adulteration is, however, practised, the seeds used for this purpose being smaller fescues (see Figs. 36 and 37), and purple melick-grass (Fig. 29), the latter a useless weed. Seeds of purple melick-grass are larger and broader at the base with more glumes and a longer projecting rachilla.

(g.) CUCKSFOOT (*Dactylis glomerata*, L.).

The seeds of this grass are a pale yellowish-white. The flowering glume has a strong midrib, with stiff hairs upon it, and is tipped by a stiff, rough, and slightly curved awn (Fig. 30).

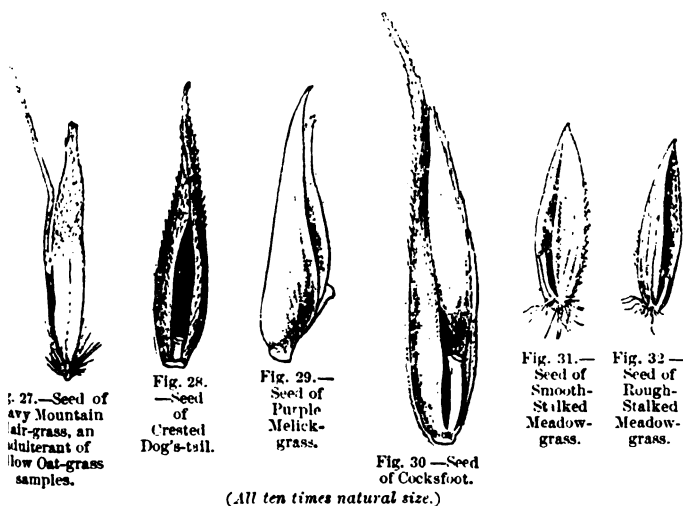
The germination capacity should not be less than 75 or 80 per cent. Samples usually are pure, but fraudulent admixture

h seeds of perennial rye-grass (Fig. 38), fescues (Figs. 36, 37), and purple melick-grass (Fig. 29), are met with. Yorkshire fog (Fig. 22) and dock seeds (Fig. 3) are impurities, occasionally seen in samples.

SMOOTH-STALKED MEADOW-GRASS (*Poa pratensis*, L.), AND ROUGH-STALKED MEADOW-GRASS (*Poa trivialis*, L.).

The seeds of these two grasses cannot, by means of a pocket-lens only, be distinguished from each other with any certainty.

Both are small pale brown seeds with a tuft of white woolly hairs at their bases (Figs. 31 and 32). Neither are awned, but both have glumes with prominent midribs.



Usually the seeds of rough-stalked meadow-grass are heavier and more pointed than those of the smooth-stalked species.

The germination capacity of both should be not less than 60 per cent.

Purple melick-grass (Fig. 29) and tufted hair-grass (the latter with a short awn and tufts of straight hairs, not tangled) are sometimes met with as impurities in samples of these meadow-grasses.

(i.) WOOD MEADOW-GRASS (*Poa nemoralis*, L.).

The seeds resemble those of the preceding species, and cannot be distinguished from them. The grass, however, has only a limited application, and need not be considered by the farmer.

(k.) MEADOW FESCUE (*Festuca pratensis*, L.).

This is one of the larger grass seeds and has a rounded flowering glume, which is thin and occasionally split near its tip; sometimes it bears a very short awn. The rachilla, which is the chief distinguishing feature of the seed, is round, of equal thickness all the way up, and ends in a flat projecting top (Fig. 33). It also juts out a little from the pale. The germination capacity should not be less than 90 per cent.

Adulteration with cheap perennial rye-grass seeds was formerly extensively practised, but now is not so common. However, it is always necessary to specially examine samples for this impurity.

The rachilla of the rye-grass seed is not round or cylindrical, but oval or triangular in cross-section, it is also broad at the top and narrow at the base (Fig. 38), and lies close to the pale.

The seeds of obnoxious brome-grasses are not uncommon impurities, and should be sought for. They are nearly twice the size of meadow fescue seeds, and possess long awns (Fig. 34).

(l.) TALL FESCUE (*Festuca elatior*, L.)

is probably only a tall growing form of meadow fescue. Its seeds are larger, somewhat narrower, and often bear short awns near the tip of their flowering glumes.

A coarse growing reedy form of tall fescue, named *Festuca arundinacea*, Schreb, of no agricultural value, is sometimes sold in place of the inland plant. Its seeds (Fig. 35) are practically identical in appearance with those of proper tall fescue, except in colour, which is usually paler.

(m.) SHEEP'S FESCUE (*Festuca ovina*, L.). HARD FESCUE (*Festuca duriuscula*, L.).

The distinction between these grasses is not clearly defined by botanists. Seedsmen usually merely screen off the smaller seeds (Fig. 36) from a parcel and call them sheep's fescue, and send out the larger awned seeds as hard fescue (Fig. 37).

The glumes are smooth and pale brown, and the rachilla has a flattened top and juts out from the pale.

ermination capacity should not be less than 70 per samples are usually pure, but it is advisable to look for sorrel seeds (Fig. 3), brome-grasses (Fig. 34), and purple (Fig. 29).

(n.) PERENNIAL RYE-GRASS (*Lolium perenne*, L.).

Seeds of this grass have smooth awnless flowering glumes pointed tips. The rachilla lies close to the pale, and is ; at the base it is narrow, and gradually widens out

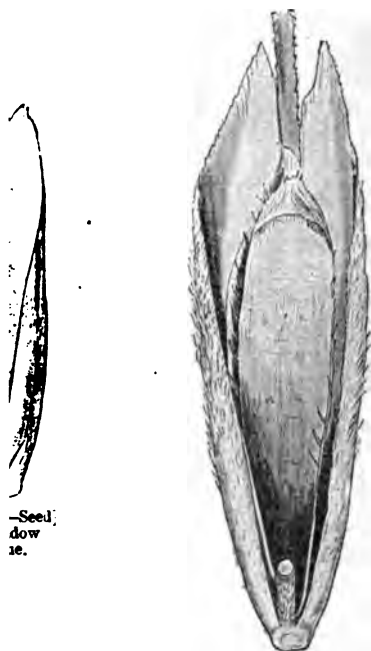


Fig. 34.—Seed of Soft
Brome-grass.

(All ten times natural size.)



Fig. 35.

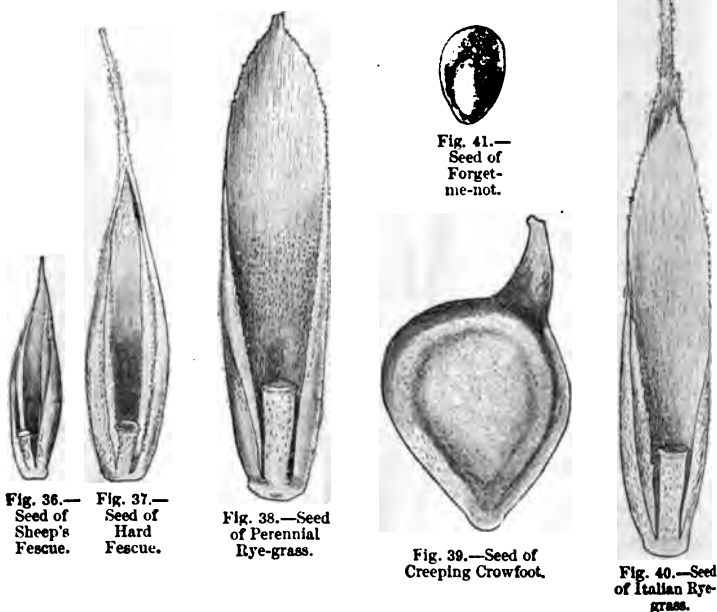
the top, even more so than shown in Fig. 38. Samples somewhat high weight per bushel are sold in the market under the names of Eaver, Devonshire Evergreen, and Pacey's rye-grass. The "fine-leaved rye-grass" samples are merely small seeds from the bulk of an ordinary parcel.

ermination capacity should not be less than 90 per cent and it is advisable for the farmer to purchase no samples weighing less than 24 or 25 lbs. per bushel.

Rye-grass seeds are usually sold pure, but are badly cleaned; chaffy samples are not unfrequently met with containing seeds of Yorkshire fog (Fig. 22), narrow-leaved plantain (Fig. 2), creeping crowfoot (Fig. 39), and black medick or trefoil pods.

(o.) ITALIAN RYE-GRASS (*Lolium italicum*, A. Br.).

The seeds of this grass resemble those of perennial rye-grass, with the exception that their flowering glumes possess long straight awns, and are usually more ragged and split at the tips



(All ten times natural size.)

The germination capacity should be from 85 to

imperfectly cleaned samples contain similar impurities as those present in the preceding species, as well as brome-grasses (Fig. 34), ox-eye daisy (Fig. 6), nipplewort (Fig. 7), docks (Fig. 3), and forget-me-not seeds (Fig. 41), which are small and black, with shining surfaces.

Good clean samples should weigh about 22 or 23 lbs.

III.—*The Advantages of Co-operation and Combination among Agriculturists for Purposes other than mere Exhibition.* By R. HENRY REW.

INTRODUCTORY.

As for several years it has been a part of my duty to endeavour to impress upon agriculturists the advantages of co-operation and combination for purposes other than mere exhibition, the subject upon which I have been invited to write is one which I have had opportunities of studying. I may perhaps be allowed at the outset, parenthetically, to disclaim responsibility for any slur which might be thought by some persons to be implied in the expression, "*mere exhibition.*" Although I have long held the opinion that Agricultural Shows absorb, in proportion to the benefit resulting from them, an excessive amount of energy and money, yet I should be the last to reflect upon them or their usefulness. It is quite easy to defend them convincingly, and there are hosts of people who would be prepared, if necessary, to engage in their defence; but, for my part, I am debarred by the terms of my subject from discussing them on the present occasion.

But outside the showyards, the world of agricultural combination lies all before us to choose from; and, for the sake of clearness, the subject may be divided under the traditional three heads. The objects for which agriculturists may combine may be classed as under—

1. Political.
2. Social and Educational.
3. Commercial.

The idea of this division may perhaps be put before many minds in a concrete form by remarking that, for the first object, a Chamber of Agriculture, for the second a Farmers' Club, and for the third an Agricultural Co-operative Association, would be respectively the typical form of combination. There is nothing in the nature of things to prevent any Chamber, Club, or Association taking up any two, or, in fact, all three of these objects, and cases might be quoted where this has been done effectively, and with economy of machinery and effort. But the popular distinction between the three classes of bodies mentioned runs very much on the allocation of objects which I have set forth.

COMBINATION FOR POLITICAL OBJECTS.

As regards political objects—giving the word, of course, its broad and true meaning, and not its debased application to party politics—the necessity for combination need hardly be argued.

It is a truism that, if agriculturists wish for alterations in the laws or in their administration, whether imperially or locally, the only means of giving effect to their wishes is by combination. And, in these democratic days, it is equally self-evident that the stronger their combination the greater their chance of success. I do not propose to labour this point, nor to enter upon the attractive field of controversial subjects which it suggests. The political combination of agriculturists in this country has never attained the formidable character which may be seen in some other countries. But, in spite of this, a good deal has been done by such combination as has existed, and, in proof, one illustration, which has now been practically removed from the category of debatable subjects, may be cited, viz., the statutes preventing the importation of diseases of cattle, and enabling effective measures to be adopted for suppressing outbreaks of disease if they occur at home. It will not be denied that the satisfactory security for the health of the flocks and herds of this country, which farmers now enjoy, has been obtained by combination, and would not have been obtained without it. *Ex uno disce omnes*. What applies, unquestionably, to cattle disease may be applied, at the reader's good pleasure, to other political matters affecting agriculture.

SOCIAL OBJECTS.

One enters perhaps on somewhat delicate ground in referring to combination for social objects—in other words, to Farmers' Clubs, in the "club" sense. It would be idle to ignore the fact that in olden days, and possibly to some extent now, the market-day club was not altogether a desirable institution. But the club, in the sense not of a mere arrangement for eating and drinking, but in its more civilised modern form, has, in my judgment, many advantages. Some remarks made by Mr. Clare Sewell Read, in the course of a discussion on a paper which I read before the Farmers' Club in 1896 on "Co-operation for the Sale of Farm Produce," impressed me, because they confirmed on the very highest authority a notion which I had gathered in the course of my travels among farmers. He said:—"Farmers of course are the very worst men to combine about anything. Their isolation is the chief cause of it, I believe, and there is also that dogged independence which always has stuck to the British farmer. I believe our social intercourse with each other does not exist now in the same way as it did years ago. There is another drawback to combination and confederation, and that is the loss entirely of our market dinners and teas. A man at market perhaps may snap up a chop somewhere, but he is more

kely to get a glass of beer and a bun at a pastrycook's shop, and go home by train. I can remember when fifty or sixty farmers used to sit down at a hotel in Norwich, at three o'clock, and never think of getting up until five. The result was that during those two hours there was an immense amount of information imparted, and a confederation and co-operation resulted among those jolly men which really does not exist now." A visitor to a market ordinary nowadays is sure to be confronted by a lament over its decay from the few farmers who still remain faithful to it. Perhaps in some cases the candid observer may mingle other feelings with regret, but at the same time there is indisputably very much shrewdness—as indeed there always is—in Mr. Read's observations. It is not good for a man to be alone, and the farmer, by the nature of his calling, is too much alone—too constantly isolated. The plan admirably conceived and carried out by the Newcastle Farmers' Club—to quote the best within my knowledge in the provinces—the London Farmers' Club being of course exceptional—might well be adopted more generally. In that case a club room is provided which is not only well furnished with facilities for writing, reading, transacting business, or conversation, but has also a very useful library of agricultural books. This no doubt means expense, and can only be justified by a considerable membership. But the more common plan of reserving a suitable room, for use as a club room for members to meet in on market days, is, if properly managed, a good one. Some may perhaps object to this on the ground that the room is almost of necessity at a hotel or public house, and if other suitable accommodation were available it might be better to obtain it. But the man who abuses the fact that he meets his neighbours on licensed premises will certainly possess no more self-restraint if he does not belong to the club. Nor is it in the least necessary that there should be, I will not say abuse, but even use, of the facilities for obtaining intoxicating liquors. I have more than once attended meetings of the Blandford Farmers' Club when from thirty to fifty members were present, and not one of them indulged in anything stronger than tea or coffee. At other clubs also I have noted that if there has not been the same remarkable unanimity, there has been at any rate a proportion present who have either abstained altogether or have indulged only in non-intoxicating beverages. My experience, therefore, impels me to deny as a libel the insinuation sometimes made that a Farmers' Club in its social aspect necessarily involves anything that the most austere critic could object to, while I am sure that it has possibilities which, though often rated as trivial, are nevertheless of substantial advantage.

EDUCATIONAL OBJECTS.

"From grave to gay, from lively to severe." In considering the objects of an educational character for which farmers may combine we approach, in the first instance, the typical Farmers' Club from its graver side. Papers and addresses on practical subjects, followed by discussion, form the more serious side of its functions. It is to be regretted that in this direction also there appears to be degeneration. The problems and difficulties of practical farming have increased enormously during the latter half of the present century, partly because circumstances have compelled closer attention to detail, but mainly because the application of science in its various branches has thrown new light upon the cultivation of the soil and the management of stock. Forty or fifty years ago Farmers' Clubs discussed with vigour and animation the actual work of the farm. As I write I take down at hazard a volume of the 'Farmers' Magazine,' and I find papers and discussions on the "Draining of Land," at the monthly meeting of the Durham Farmers' Club; "On Growing Potatoes," and "On Growing Swede Turnips," at the Wortley Farmers' Club; on "Manures," at the Bromsgrove Farmers' Club; on "Economy in the Production of Farmyard Manure," at the Ecclesfield Farmers' Club; on "Steam-power and Horse-power in Farming," at the Wakefield Farmers' Club; on "Guano," at the Ecclesfield Farmers' Club, and so forth. This was in 1845. No doubt similar instances might be found now, but comparatively the farmers of to-day do not appear to discuss these practical subjects to the same extent as formerly. It may be that the wider diffusion of information in periodicals and newspapers may partly account for this, although there is no doubt that to many persons, but especially to those who are not students by training and habit, word of mouth is more useful and instructive than the printed page. It might be well worth consideration whether such practical addresses and discussions could not be advantageously multiplied at meetings of Chambers of Agriculture and Farmers' Clubs without in any way interfering with their other functions.

Another and still more effective kind of educational work in which farmers may, and to some extent do, combine, is the arrangement and organisation of field experiments. The Bath and West and Southern Counties Society has set an admirable example in this direction; but the very magnitude of its operations tends perhaps to obscure the element of agricultural combination on which it is based. This is more evident in such a case as the field experiments carried out year after year by the Norfolk Chamber of Agriculture. It cannot be too

often insisted that a useful scheme of field experiments, or more properly perhaps demonstrations, can be conducted in a very simple way and without heavy outlay if farmers themselves co-operate. Every thoughtful farmer will be frequently making experiments for himself, and it needs only a certain amount of organisation and co-operation to enable a number of farmers in a particular district to agree on some definite method, and thus secure results which may be helpful to all. Nor need this be restricted to field experiments, although these are in the nature of things easiest to arrange. Feeding experiments on animals may be also undertaken, as has notably been the case in Norfolk. Experiments or tests carried out in this comparatively simple way are, like mercy, doubly blest. Not only may the general results be enlightening to those who have never even seen the process by which they are reached, but the act of conducting a trial under specified conditions is in itself educational, even if the final results should turn out to be *nil* or valueless.

The educational objects for which co-operation is desirable should strictly, perhaps, be limited to those which are educational to the co-operators. But I am tempted to include under this heading the combination of farmers for the technical education of their labourers. Complaints of the lack of skill among labourers are very prevalent, but it is sometimes forgotten that in the "good old days" inducements, which are often now lacking, were commonly offered to labourers to take an honest pride in their efficiency. Take, for example, the ploughing-matches and the sheep-shearing competitions which a generation or two ago were so popular. Not only did they embellish rural life with a picturesqueness and interest nowadays too often lacking, but they certainly fostered among the labourers a sense of the dignity and importance of operations which demand quite as much intelligence and deftness of hand as many of those carried out by what we term skilled artisans. The late Mr. W. C. Little—whose recent death deprives British Agriculture of one of the most devoted and able men who have ever spent themselves in its service—put this point admirably in that general report on the agricultural labourer to the Royal Commission on Labour, which may be justly described as a classic. He wrote:—

"The general impression respecting the ordinary agricultural labourer is that of a man engaged in work which requires little intelligence, skill, or training, but in reality there are few duties which he has to perform which do not call for a certain amount of judgment, dexterity, and practice; and the training and management of horses, the art of ploughing, mowing, or sowing, the use of a spade or fork must be learned; and the labourer who had not learned to economise his forces, and attack his

76. *REW on Advantages of Co-operation among Agriculturists.*

work at the point of least resistance, would be worn out very quickly."

In the same connection Mr. Little quoted with approval from a paper read in 1868, in which after saying that an agricultural labourer is "a variously skilled workman," it was observed—"It takes more varied qualities of mind and body to be a good labourer than to be a good carpenter, whose tools keep him square by line and by rule, &c., while the other makes parallel lines in a field with an awkward thing called a plough, and still more awkward things called horses."

It may be said that technical education in agriculture is now under the care of the County Councils, but that consideration, with all that hangs thereby, lies outside the scope of this paper. Co-operative education, so to speak, and subsidised education are two different things. Each may well supplement the other, and both may be joined in one enterprise. But the essence of what is here set forth is the combination of those who seek knowledge for the purpose of obtaining that knowledge for themselves. It is evident that this is a limited sphere, but within it there is room to do much without clashing in any way with other methods of imparting information.

COMMERCIAL OBJECTS.

By combination for commercial objects is meant that which is commonly called "Co-operation" in the conventional acceptance of the term. And here we come to that branch of the subject which perhaps was naturally suggested by the heading of this article.

There is no doubt that agricultural co-operation is a popular prescription for the ills of agriculture. It is the common panacea of the man in the street. Two facts have impressed themselves upon the public mind—two concrete facts—the first is Brittany butter, and the second is Danish butter. The magnitude of the supply, its persistent growth, and it must also be said the excellence of these articles, have combined to persuade the average Briton that the French and Danish farmers are very clever folk, and that if farmers in this country would only imitate them they would be wise. The said average Briton is also persuaded that the secret of the Frenchman and the Dane's success is co-operation, and consequently that it is co-operation which will save British agriculture. This is very simple and plausible, but it is not the whole of the case. We may put aside the point that the trade in Brittany butter—most of which comes from Normandy—has not been built up mainly by co-operation at all, but by the

commercial organisation of capitalist middlemen. In Denmark, although there has been some assistance from the State, it is in the main correct to say that the system of production and exportation is based on co-operative principles. One odd fact is the concentration of public interest on butter. The average Briton clamours for English butter most zealously, and when he gets it frequently refuses to eat it. But why this insistence upon butter-making? Butter is only one of the products which we import. We import, for example, far more meat of all kinds (reckoning by value) than butter, and we make nearly as much butter as we import. It is necessary to protest against the idea which seems prevalent that co-operation means butter-making, or otherwise we cannot make much progress with co-operation.

The parrot-cry "make butter like the Danes" becomes monotonous to the dairy farmers of this country who know perfectly well that in many cases they would be foolish to do so. Mr. W. J. Harris, who is a practical agriculturist and also a man of business, put the case clearly from a Devonshire point of view in a recent address. His object was to show "why it does not suit the farmers here to follow the advice of our critics, and lay themselves out for butter-making on a large scale." The passage is so pertinent that I quote it:—

"In the first place, we have very little female labour, unless we pay an exorbitant price for it. In the second place, we have but few small farms. . . . Where small holdings exist, with the female labour always present in the shape of a wife or a daughter, there butter is nearly always made. On my own property I have made many such holdings, and the small tenants all produce butter, and I believe they make it pay to do so. The dairy enables them to keep pigs, and the woman's time is given up to the dairy, the pigs, the poultry, and the calves. We have no factory within reach. The necessary condition of having as many as 400 cows within easy reach could not be fulfilled on my estate, but we do not want a factory. We make our butter on the old scalding process, and whether the quality is better than the French or not, I know not, but I do know, that although we sell it at home, and thus have no expense of carriage, we make a better price than good foreign butter is worth in London wholesale, taking the year round. Before coming here I took out the prices I had made for butter during the last twelve months, and I found that I had made over 13½d. per lb. for all I had to sell. I am aware of all the complaints that are made about us, namely, that no butter dealer in London would take the make of half-a-dozen farms in Devon and Cornwall all the year round on account of its varying in colour and quality. We really do not care

whether the Londoner takes it or not. We should probably lose 2*d.* per lb. by sending it to him. There are people nearer home who know the flavour of well-made English grass butter, and they take all we have to spare. Butter made on the scalding process, whether a separator be used or not, is, moreover, much wholesomer, in my opinion, than that made by any other process, and I expect we shall hold our price. If we adopted the advice of the Press, and sent all the butter after it is made to a factory to be made into one uniform quality and shape, I fail to see how we could do any better than the Frenchman, the Dane, or the Irishman. . . . I think I have shown that the conditions under which we farm are so different to those of the Danes, the French, and the Irish, that we do very wisely to choose not to make butter in any large quantity." Let us therefore at once disabuse our minds of the notion that universal butter-making is a necessary, or desirable, consequence of co-operation as applied to agriculture. Butter-making is a mere branch, and not perhaps the most important branch, of a wide subject.

If, as I venture to think, the popular advocacy of co-operation for farmers is founded, to some extent at least, on misconception, the opposition of farmers to the idea has, on the other hand, its tap-root in prejudice. The British farmer has the defects of his qualities. He is, by breeding, training, and habit, conservative, reticent, and, above all, egotistical. He forms in this age of socialist ideas the last bulwark of individualism. His jealousy of his neighbour is almost as strong as his jealousy of foreign competitors. To combine with his neighbours for any purpose whatever is irksome, and to combine for business purposes is repugnant. Nor should superior persons condemn him hastily. Let them reflect that thirty years ago his individualism would have been accounted for righteousness. We were all individualists then, as we are "all socialists now"; but the agricultural mind is not nimble enough to keep pace with the comersaults of our political economy.

If he were pressed for something more tangible than a general objection to co-operation, the farmer might possibly confess that he did not clearly understand what it meant. Here, again, let us not be too quick to condemn. Are we quite sure what we mean by co-operation generally, and by agricultural co-operation particularly? If we look for a definition of co-operation this is the sort of thing we find:—

"The essential characteristic of co-operation is a union of capital and labour—a certain number of labourers form themselves into a society, and they supply the capital which their labour requires. Co-operation may thus be regarded as a modi-

and form of socialism; but as in a co-operative society each member's share of the aggregate wealth produced is apportioned to the amount of capital he subscribes to the common fund, as well as the quantity and quality of the labour he supplies, it is evident that an influence is thus brought into operation to stimulate each individual's energy." *

Or again :—

"English co-operation is a system of commerce and industry, consisting of societies of working people in which the business profits of a store are given to the purchasers, and the profits of the workshop to the workers. The division of profit in the store is made according to the amount of custom, and in the workshop according to the amount of wages. The original object of co-operation was to establish self-supporting communities distinguished by common labour, common property, common means of intelligence, and recreation. They were to be examples of industrialism, freed from competition." †

It is evident that, so far, the farmer is not very much helped to understand the meaning of the application of co-operation to agriculture.

A better definition for our purpose is one given by M. Georges Michel, which is quoted by Le Comte de Rocquigny in his interesting book, '*La Co-opération de production dans l'Agriculture*,' published in 1896. It is as follows :—

"La co-opération est une entente entre des personnes qui réunissent leurs forces pour lutter avec succès contre les obstacles qui s'opposent aux individus et pour être capables d'offrir ou d'obtenir des avantages supérieurs à ceux qu'elles pourraient offrir ou obtenir si elles restaient isolées."

We get here the principle—combination for such objects as can be more advantageously achieved by mutual agreement than by isolated effort. The bearing, as Captain Cuttle would remark, lies in the application thereof. What are those objects?

I venture to reiterate what I have repeatedly said as opportunity occurred, that no one can dogmatise for this country. You cannot say that this or that object will everywhere be better achieved by co-operation than by individual enterprise. The nearest approach one might get to such generalisation would probably be in regard to the purchase of artificial manures, feeding-stuffs, and other articles required in farming. Putting aside possibly the farmer-princes—to coin a word—the men occupying very large farms and having ample capital (although I know at least one such who is a member of a local

* Fawcett, '*Manual of Political Economy*,' sixth edition, p. 103.

† Holyoake, '*The Co-operative Movement of To-day*,' p. 1.

manure-purchasing co-operative association), it is almost, if not quite, invariably true to say that farmers would gain by combination for such a purpose. The difficulty, of course, or at any rate one of the difficulties, is that, while the smaller occupiers are those who would most benefit, they are the last to find it available, on account of the necessity for the adoption of a cash basis. There are a good many associations of this character in Great Britain, and, without exception, I believe, all are doing useful and successful work. A Committee of the Central Chamber of Agriculture, which held an inquiry on "Agricultural Co-operation for Purchase," about seven years ago, reported that, so far as they were informed, "no agricultural co-operative association formed for the purpose of purchasing farming requisites has failed"—a very significant fact. The Committee strongly urged the consideration of the subject on members of the Chambers, "in the belief that, not only might articles of guaranteed quality be procured at prices less than individual purchasers can, as a rule, be charged, but that by incorporating this object among the primary functions of farmers' associations an incentive to combination will be provided, and a greater union of the agricultural community will be secured."

CO-OPERATION ON THE CONTINENT.

This side of agricultural co-operation has been developed in France to an enormous extent by the organisation of the *Syndicats Agricoles*, of which there were in 1897 no less than 1371, with a total membership of about 600,000. A brief description of these associations may be of interest. The administrative staff of an agricultural syndicate consists nearly always of a president, vice-president, secretary, and a treasurer. Some of the larger bodies—for they range in size from a membership of twenty to one of 10,000—have two or even three vice-presidents, and sometimes a secretary-general with two or three assistants. These officers form the executive bureau or council. In cases where the membership exceeds one hundred there is usually also a syndical chamber or directorate, with duties of a consultative character but nevertheless exercising more or less control over the council of management. A salaried manager is employed in a few instances, but it more frequently happens that the whole of the work is performed by the president and other officials, who receive no remuneration for their services. The members of the council are elected for a term of years, either by votes at the general meeting, or, where there is a directorate, by the directors from amongst themselves. The directors are always elected at the general meetings for a

period varying from two to nine years. When the operations of a syndicate extend over a considerable area it is usual to select a director for certain districts or divisions. Thus, in the large departmental syndicates a director is elected for each *arrondissement* (= anglicé "Hundred"). Smaller bodies, having members resident in several communes or villages, generally arrange that the syndical chamber shall be comprised of delegates representing each village or commune in which not less than ten members reside. In both cases the director or delegate acts, as a rule, as the administrative agent for his district, and conducts the necessary correspondence with the central office. The syndicates derive their resources mainly from the members' subscriptions, and from a small commission levied on the sales and purchases effected. Some of the more fortunate among them have been the recipients of gifts and legacies, while others are subsidised by the "conseils-généraux" and by the agricultural societies. Usually the subscription ranges from 2s. 6d. to 5s. per annum, though in a few cases it is less than half the smaller sum mentioned. Sometimes there is a graduated scale of subscriptions arranged to meet the circumstances of the different classes of members, so that a poor peasant farmer pays less than his richer neighbour, while the labourer's contribution is merely nominal. Another system has been adopted by three or four associations whereby the ordinary members' subscriptions are proportional to the area of land they own or occupy, or to the amount of land tax to which they are assessed. Then, too, in many syndicates there are, in addition to the ordinary members, "founders" and "honorary members," chiefly country squires, retired officers, and other local magnates who are candidates for the more prominent positions in the syndicates, and whose subscriptions always exceed those of the ordinary members. It is an almost general practice to charge a small commission on the transactions undertaken on behalf of the members, especially in respect to the purchase of manures. This goes to defray the expenses of analysis and distribution, and is usually fixed at 1 per cent. or 2 per cent. on the invoice prices; it seldom exceeds 4 per cent.

Nearly all the syndicates were originally formed for the purchase of artificial manures and for the suppression of fraud in the manure trade, two objects which still constitute the main feature of their work. Co-operation in purchase has in recent years been extended to feeding stuffs, seeds, insecticides, machines, implements, and other requisites. The procedure is practically the same in all cases. Invoices are checked and passed by the council of the syndicate, and bills, payable at one, two, or three months, are drawn by the manufacturers and

tradesmen on the individual members for the goods supplied. Few of the associations undertake responsibility in respect of payment of goods ordered on behalf of members. But although the syndicates offer no material security to the traders, their reputation for soundness in business affairs is in itself a moral guarantee. It very rarely happens that a member fails to meet an engagement contracted through his syndicate, for default invariably entails expulsion.

It will be observed that the principles on which these syndicates are conducted differ from those generally adopted by similar local associations in this country. We may take an instance from the report of the Committee of the Central Chamber of Agriculture already referred to:—

“The South Durham and North Yorkshire Association (established 1878), whose headquarters are at Darlington, has from forty to fifty members, who pay an entrance fee of 2*d.* per acre, and 2*s.* per ton registration fee on all manures ordered. Only manures are dealt in at present, but the Association hopes to include seeds, foods, and implements shortly. The secretary sends in January to each member a list of manures, which is returned marked with the number of tons of each kind required, and the month in which it is wanted. All the requisitions having been scheduled, the secretary advertises for tenders from manufacturers, stating maximum and minimum quantity of each manure required, and the station at which it is to be delivered. Contracts are settled by the Committee (of nine members) elected annually. The secretary then informs each purchasing member of the price of the manure, and the amount due from him must be sent before goods are delivered. After a certain quantity has been delivered, the Committee ballot for the farms where the samples shall be taken for analysis, and the secretary, accompanied by a representative of the manufacturer, goes round and takes samples. All manures are bought on stated values per unit, and for excess up to 10*s.* per ton above the agreed standard. Deficiency below standard is charged for on the same basis, with 25 per cent. in addition as a penalty.”

In England the cash basis is, I believe, invariably adopted, while in France, as we have seen, credit is given. No doubt credit must be paid for in some way, but if membership of the association is considered to be a moral guarantee against bad debts—as is stated to be the case in France—no doubt the additional charge for, say, two or three months' credit would be very small.

The development of agricultural co-operation has been even more remarkable in Germany and Denmark than in France. In Germany there are no less than 7,762 registered agricultural

co-operative associations, comprising 5,382 agricultural credit societies; 894 societies for the purchase of fertilisers, seeds, and implements; 1,262 co-operative dairies, and 224 other co-operative societies. A full account of the development and organisation of the co-operative dairies in various parts of Germany appears in the Report on Dairy Farming in Denmark, Germany, and Sweden (C. 7,019), published by the Board of Agriculture in 1892. They may be divided into three classes, viz., dairies which manufacture butter and skim-milk cheeses, and thus utilise the skim-milk; dairies in which only the cream is used, the skim-milk and butter-milk being returned to the members; and dairy stores in which fresh milk is sold on behalf of the members, and only the surplus converted into butter and cheese. Dairies of the second class are the most popular, as the skim-milk and butter-milk can generally be more profitably used for rearing calves and fattening pigs than by its conversion into cheese. Taking the accounts for 1892 of 288 of these co-operative dairy societies, it appears that the average number of members in each society was forty-four, the smallest number returned being ten, and the largest ninety. The average quantity of milk dealt with in the year by each society was 210,000 gallons. The average working capital was 2,550*l.*, and the average reserve fund 189*l.* The average net profits of seventy of the dairies on the year's working was 168*l.*, and fourteen of them returned an average loss of 60*l.*

Denmark has a large number of agricultural co-operative societies which may be classified as follows:—

- (a.) For the breeding and rearing of cattle, horses, and pigs.
- (b.) For the manufacture of butter and cheese. There are from 1,100 to 1,200 of these, and roughly it may be said that there is a co-operative dairy society for every parish.
- (c.) For bacon-curing or pig-killing. There are about eighteen of these.
- (d.) For collecting and exporting eggs. These are now federated in a large central association.
- (e.) For bee-keeping.
- (f.) For fruit-gardening and horticulture.

Space would fail to give details of these various associations, and we must pass over the development of agricultural co-operation in other Continental countries and in the United States and the Colonies. A considerable amount of information, in a summarised form, may be found in the Report, dated April 4th, 1898, of the Committee of the Central Chamber of Agriculture on "Co-operation for the Sale of Agricultural Produce," from which some of the particulars given above have been taken.

CO-OPERATION IN IRELAND.

But the most interesting of all attempts at agricultural co-operation is that which has been made by the Irish Agricultural Organisation Society, under the leadership of Mr. Horace Plunkett.

That society was established in April, 1894, to carry on a movement which had been promoted during the five previous years by a few individuals, and had assumed too large proportions to be carried on without additional support. The objects of the society, as stated in its rules, were "to improve the condition of the agricultural population of Ireland by teaching the principles and methods of co-operation as applicable to farming and the allied industries; to promote industrial organisation for any purposes which may appear to be beneficial, and generally to counsel and advise those engaged in agricultural pursuits."

At the time of the formation of the society the work of organisation had been confined to the establishment of co-operative creameries, and at the end of 1893 thirty of these were in existence. The total number of shareholders was 1,509, the paid-up capital 13,845*l.*, the loan capital 7,746*l.*, milk purchases 123,780*l.*, butter sales 140,780*l.*, value of buildings and plant, after allowing for depreciation, 24,872*l.*

According to the last annual Report (for the year ending March 31st, 1898) there are now 243 societies, including 123 dairy and agricultural societies, thirteen auxiliary societies, seventy-seven agricultural societies, fifteen agricultural credit banks, thirteen miscellaneous societies, and two federations.

The 123 dairy societies alone have a membership of 15,136, their total sales of butter in the year 1897 amounted to 334,711*l.*, representing 7,381,393 lbs. of butter produced from 18,432,672 gallons of milk. Their paid-up share capital is 39,019*l.*, and the value of land and buildings, after allowing for depreciation, is 67,331*l.*

The seventy-seven agricultural societies have a membership of 7,921, and a turnover of 43,104*l.* Generally speaking, they confine their operations to the purchase of their members' agricultural requirements, but some have made considerable sales of live-stock, chiefly pigs.

The fifteen agricultural credit banks in Ireland possess peculiar interest, because they have introduced a form of co-operation which is quite novel in this country, although it has been extensively adopted in Germany for many years. I have already mentioned the fact that in Germany there are more than 5,000 of such associations, and those in Ireland are formed

practically upon the same model. They are suited for small holders, cottagers, and peasant proprietors, the idea being that the association lends money to its members on their personal security. The loans are made by the committee, who make them only when they are absolutely satisfied of the good faith and honesty of the person borrowing. Personal knowledge of the borrower, and strict investigation of the purpose for which the money is needed, which must be of a productive nature, are the security for the loan, the association having an unlimited liability for its transactions. The idea sounds at first contrary to all our notions of business and finance, but as a matter of fact, it has been found in practice to work most satisfactorily. The Irish Organisation Society have great faith in these agricultural credit banks as a means of elevating the Irish peasants. They say, "We attach very great importance to the introduction of the Raiffeisen (*i.e.* the credit bank) system into Ireland, and are inclined to put it in the forefront of our propaganda. . . . The need of a purely humane credit system, sufficiently safeguarded, but established for the benefit of borrowers, has been proved upon us by our knowledge of the extent to which usury prevails." I would venture to commend a study of this branch of co-operation to all who are interested in the subject, though in doing so they must put aside many of their pre-conceived notions and prejudices about finance. I may add that several of these banks have been started, and are now at work in England, at, for instance, Pembury in Kent, Scawby in Lincolnshire, Wiggenshall in Norfolk, Cottenham in Cambridgeshire, Ayleston in Worcestershire, Hedge End in Hampshire, and Aylesfield in Suffolk.

In connection with the various local societies in Ireland two federations have been formed. One of these is the Irish Co-operative Agency Society, composed not of individuals, but of local creamery societies, which each take twenty 17. acres. The managing committee is, of course, composed of representatives of the societies who hold shares. The object of the agency is thus stated in its constitution :—"To promote the co-operative movement in Ireland by the selling on commission of Irish creamery and other butter on a commission not exceeding 2½ per cent. for members consigning regularly, and a commission not exceeding 5 per cent. for non-members and members consigning irregularly." The constitution also proposes powers for dealing in other farm produce, but substantially it at present devotes its energies to the sale of Irish creamery butter, having branches in London, Glasgow, Manchester, Edinburgh, Birmingham, Newcastle, Cardiff, and other places. The Society has been hampered in its trading opera-

tions by an insufficiency of capital, but its business has steadily increased, its turnover in 1893 having been 45,000*l.*, and in 1897, 112,000*l.* According to a statement made by Lord Monteaigle, the creameries which sold through the agency made about a tenth of a penny per pound—or about 1*s.* per cwt.—more for their butter throughout the year than those which sold their own butter direct.

The application of the principle of agricultural co-operation to Ireland is the making of history in a sense wider than can here be discussed. The point for British farmers to consider is how far it forms a guide and an example to them. It is an obvious remark to say that the conditions are radically different. But the broad and striking fact is the sturdy growth in unpromising soil of the plant of self-help and mutual association. The difficulties to be encountered may vary, the conditions be almost entirely different, but the principle which has so conclusively proved its soundness in one set of circumstances only needs adaptation to prove equally sound in practice elsewhere.

To sum up on this point—the general advantage of co-operation among farmers for the purchase of artificial manures, feeding stuffs, &c., seems, as already noted, to be unquestionable, while as to the desirability of co-operation for the sale of farm produce, it is impossible to assert more than that, under certain conditions, it has proved highly successful, although it must also be added that success has been by no means uniform. I venture to think that the conclusion arrived at, after much consideration and inquiry, and drawn up in very measured terms, by the Committee of the Central Chamber of Agriculture, is sound:—

“Nothing which has come before the Committee has led them to believe that the profits of all English farmers could be straightway increased by the adoption of any universal system of co-operation, even supposing that the establishment of such a system were possible. Some farmers are producers on a sufficiently large scale to be able to make practically as good terms as they would be likely to obtain through an association, while many of the smaller farmers—especially near large centres of population—dispose of their produce direct to the consumers. Nor is it reasonable to suppose that in a country like England the producers of any class of commodities can in every case be their own salesmen and distributors, even by means of co-operation.

“But the Committee nevertheless consider that the association of producers in particular districts for the joint disposal of certain classes of produce would be in many cases advantageous.

The advantage appears to be most marked in the case of produce which is subjected to a process of manufacture; as, for example, in the conversion of milk into butter or cheese, in the curing of bacon, or in the making of jam. In such cases there is an obvious economy of labour in dealing with large quantities of produce, and there is no reason, on the face of it, that the benefit of such economy should not be secured by the producers themselves in an association for the purpose, provided they are willing to find the necessary capital. It is further shown by the experience of the Farmers' Auction Mart at Darlington that combination for the sale of stock may be distinctly beneficial, and the same principle has been successfully applied to the sale of milk in bulk—an industry which entails special risks and difficulties upon individuals, and in which also the ordinary distributive agencies are very powerful and apt to be autocratic in their dealings with isolated producers. Such attempts as have been made to co-operate for the disposal of ordinary crops, as, for instance, corn, hay, straw, potatoes, &c., have not as yet been sufficiently long continued to enable any reliable opinion to be formed as to their ultimate success. In the case of small producers—when a number are to be found in one district—the benefits to be derived from co-operation may be considerable. Poultry-keeping in such hands loses much of its benefits without some kind of organisation for collecting eggs for chickens. This is supplied in certain districts, in a rough-and-ready way, by a system of intermediaries generally known as 'higglers.' This is an industry in which the co-operation of producers might be highly beneficial, and the establishment of poultry-fattening stations on co-operative principles in suitable districts seems a specially hopeful development."

This forms a fairly complete summary of the results of the inquiries of the committee with regard to such attempts as have been made in England, and they are not many, to co-operate for the sale of produce, and they go on to express their belief that co-operation for sale might advantageously be adopted in England in particular districts for particular products. They continue: "A district where co-operation for the disposal of produce might be tried with the greatest probability of immediate success would be one where a considerable number of comparatively small occupiers of land, all engaged in the same class of farming, are clustered together. The products to which the principle of co-operation may be most usefully applied appear to be butter, bacon, milk, poultry, and eggs. In making this statement the committee must not be understood as limiting the possibilities of co-operation, but only as indicating the direction in which from past experience they

see most immediate hope of its successful application in this country."

In conclusion, the committee express their conviction of "the soundness of the view strenuously urged by Mr. Plunkett that associations of producers must be really co-operative. In other words, they must consist of and be managed by the producers themselves, who must risk their own money and give their own time to make the enterprise."

These conclusions were signed by Mr. W. Lipscomb (Chairman), Lord Wenlock, the Right Hon. Horace Plunkett, M.P., the Right Hon. J. L. Wharton, M.P., Mr. Yerburgh, M.P., Mr. D'Arcy Wyvill, M.P., Mr. Clare Sewell Read, Mr. S. Rowlandson, Professor Long, Mr. J. Bowen-Jones, Captain Stuart-Wortley, Mr. F. E. Muntz, Mr. T. Latham, and Mr. Barfoot-Saunt, and consequently they carry far more weight than any opinion of mine could do. Perhaps, however, in this place, I may say that personally I concur entirely in these conclusions, and that I have nothing to add to them.

It is quite evident that the wide subject set forth at the heading of this article has only been incompletely and imperfectly dealt with. To exhaust it would need a volume. It is a well-worn theme—the desirability of greater combination among farmers—and I make no pretension to have anything very new to say upon it. All I have hoped to do is to touch upon one or two points which might lead to further reflection and inquiry from those with whom lies the opportunity of giving practical effect to ideas. The power which in these days lies in effective combination is in many directions incalculable, and if that power can be more strenuously employed for helping the wagon of British agriculture out of the ruts among which it has lately laboured, more immediate benefit may result than from the most vigorous supplications for extraneous assistance.

The Farm Schools of Normandy and Brittany.

By GRANVILLE E. LLOYD-BAKER.

THE question of establishing a School of Practical Agriculture for sons of farmers and labourers having been raised in the County Council of Gloucestershire, I offered to go to France for the purpose of visiting the *Fermes écoles* or *Ecoles pratiques*, which have done so much for agriculture in that country. I selected the districts of Normandy and Brittany, because the

oil and agriculture there are similar to our own; whereas in the South of France, where education is said to be extremely good, the culture of vines and silkworms is the chief consideration.

On September 21st last, I crossed from Weymouth to Jersey, and thence to St. Malo. I loitered a little at Dol, Mont St. Michel, and Caen, so as to get an opportunity of talking to farmers and tradespeople with a view of ascertaining how far these schools were appreciated by the class for whom they were provided. The information thus procured was, however, scanty. Little was known, but it was thought that the result was good.

I propose to give a short account of the schools in the order in which I visited them, and then to summarise their respective advantages, as, although established on the same lines, there are striking differences in the details of their management.

COIGNY.

From Mont St. Michel I went, *via* Coutances, to the bright little Port of Carentan, in Manche, where a considerable trade is done in butter and eggs. The town is not large, but the fine old church shows that it has always been of importance; while its good though cheap inn (*Hôtel d'Angleterre*), and its prosperous appearance, show the result of the agricultural wealth of the neighbourhood. I drove out through flat lanes, shaded by trees, past large farm-houses, surrounded by orchards and rich meadows, to the Agricultural School of the old château of Coigny. The original building was burnt down about 200 years ago, and another handsome château was then built half a mile further on. Only a portion of this building remains, and this contains a splendid mantelpiece in the room that is now used as the College Museum. The old architecture was reproduced in the new buildings, which were used as a farm until eight years ago, when the proprietor, in order to start the school, fitted it up with all that was required, and let it at a reduction of 50 per cent.

As with all these schools, the State pays the salaries, the department finding the house and land. M. Etienbled, the director, receives 160*l.*, and there are seven professors or masters, at salaries ranging from 64*l.* to 100*l.* A number of scholarships of 20*l.* each, which is sufficient to pay for board, lodging, and washing for ten months of the year, are provided by the State; August and September are always holidays.

At this school, dairy work is the speciality; separators are

used, and butter is made, but not cheese. Excellent Cotentin cows are kept. Chemistry, geology, and botany are taught, and horticulture and pisciculture are also given a place. In spite of all advantages, this school does not attract many pupils. There is room for forty, but only twenty were there at the time of my visit. It seems as if this school were too lavishly equipped, and went beyond the needs of the neighbourhood.

DUCEY.

I had intended to visit next a school at La Guerche, near Vitré, in Brittany, and I telegraphed to ask permission to do so. The reply was not encouraging—"The school is closed; visit Ducey." I thought my two first attempts were most discouraging. However, I started for Avranches and drove out eight miles to Ducey, where I was rewarded by seeing a school carried on successfully under adverse circumstances.

Frère Salonas, the Director, told me that a religious Brotherhood had, under Government, managed a school for many years at Ducey, but that seven years ago the Government decided that no religious teaching should be allowed in any school under its control, and so the Brothers were turned out. They then took a house with a large garden on the outskirts of the town, and arranged with a neighbouring farmer that their pupils should work on his farm—their work being given in exchange for the experience gained—and that veterinary lectures should be illustrated by his horses and cattle.

The good reputation of the Brotherhood has filled the school with pupils, though there are no scholarships or Government help. Seven Professors of good standing give weekly lectures on such subjects as chemistry, botany, veterinary science, &c., for which they charge nothing. Great attention is paid to apple-culture. Each pupil grafts a tree, of which he has the care, and learns to prune and train it. He is taught to make cider and also brandy from apples. Milking, foddering, and butter-making are taught, and also skimming; for the Brothers think that a separator is objectionable in a district where the rearing of calves is an important industry.

During the first year the pupils work till mid-day in school, and afterwards on the land; the second year the process is reversed. As there are sixty pupils (the largest number that I found in any school), there are always about thirty in school and thirty on the land. The full charge for board, lodging, washing, and instruction is 20*l.* for the ten months; day pupils pay 4*l.* for the same period.

I had heard from Frenchmen that if I wanted to see a really

conomical school I must seek one of the Clerical Schools. I certainly found this exemplified at Ducey, and its popularity testified to its efficiency.

SARTILLY.

The Government, when it discarded the Clerical Schools, established a secular Farm School at Sartilly, about eight miles on the other side of Avranches, and two miles from the Station of Sartilly. I walked from that Station—there was a first-rate road—through beautiful rich valleys, with numberless small farms and orchards, and some very old mills, which had been turned by little streams, but seemed falling into ruin. On arriving at Sartilly I found a large square, and on one side of it the National School, on which the Farm School has been grafted. The Director, M. Aubril, who studied agriculture for two years and gained a certificate, now carries on both schools in one building. He receives a salary of 72*l.* only for the Agricultural School. There are four professors or assistant-masters belonging to this side, two of whom, at 56*l.* each, live in the house and pay 16*l.* each for their board, and the pupils pay the same. There are forty pupils, who work on the land; they have also five or six hours of school-work, except in the busiest times. The large garden shows the attention paid to horticulture, and especially to the careful training of apple-trees. It is perhaps due to this part of the education in France that the orchards of Normandy put those of England to shame. There you never see the up-sided, or ragged, useless trees which so often disgrace our orchards.

During the time I was there, the annual examination for admission and for certificates was going on, and I had an opportunity of talking to the two examiners. I found that the school had a very good name; and, no doubt, M. Aubril's reputation as Director of the National School and his influence with the pupils has had its effect in filling it.

RENNES.

My next visit was to the school of Les Trois Croix, near Rennes, where the Director, M. Hérissant, who is also President of the Association Pomologique, most kindly explained to me all the details of the school. I found afterwards, at the *Institut Agronomique*, at Paris, that this is considered the foremost school of its kind in France. The buildings are very fine, and have cost the Department 8,000*l.*, and the live stock is first-rate; only the

finest specimens of each breed of cattle and sheep are kept. The annual expenses are as follows:—

Director's Salary	200
Two Assistants, 100 <i>l.</i> each	200
Occasional Veterinary Lectures	28
Two Horticultural and Agricultural Teachers, 70 <i>l.</i> each	140
Schoolmaster	120
Sundries	48
	<hr/>
	736

The Director has, in addition to his salary, a good detached house and garden. Though the salaries are not exorbitant, the number of masters for twenty-seven pupils seems large. It is intended, however, to increase the pupils to forty. The general routine is similar to that of the other schools. Pupils are received at from thirteen to eighteen years of age. Half work on the land, while the others are at school. They remain two years at the school and receive a good general education, besides special instruction in botany, geology, chemistry, &c. The process of analysis is shown and its value explained, but the pupils do not practise it. They work on the land and tend cattle and, with special permission, they may milk; but this is not generally allowed, as the specimen cows of the Cotentin, Dutch, or Shorthorn breeds are too precious to be trusted to young hands. This school seemed to me suited to a superior and richer class of pupils than the others. M. Hérisant told me that the school was started in 1832 as a private speculation, in order to train labourers and small farmers, and that they used to work in school only one hour a day; he added that many people regret the change from the old system. It seems a law of nature that philanthropic institutions should be improved (?) till they are suited to a higher class than that for which they were intended. No doubt this school is excellent for turning out agents or stewards, but it would be of no use to the labouring class. Each pupil pays 20*l.* per annum for board and lodging, which is about the usual charge. Many hold scholarships of 10*l.* or 20*l.*

LE NEUBOURG.

About next to Le Neubourg, near Evreux. The school is on the outskirts of the town, which, though small, is a very busy one, and has a large market. This school, though conducted on the same lines as the others, has one peculiarity. The farm stock belongs to M. Pargon, the Director, who makes what he can out of the farm, besides receiving 160*l.* for salary. He rents some

resides what is attached to the school. This plan ensures quality of the pupils' work and saves the Department the expense and risk of providing stock. I saw the pupils come to their mid-day meal, and there could be no doubt about them working as ordinary labourers. At this school I saw the genuine specimen of a labourer's son that I could find. His father was one of the workmen in the town who wished to send him back on to the land. Most of these schools profess to take labourers' sons, and perhaps did so formerly, but now they only receive a higher class. It cannot be said, however, that the small farmers whose sons are sent there lead a more useful life than labourers do either in France or England.

GRIGNON.

Recently, I paid a visit to Grignon, near Versailles. This is a grand château in a grand park. It was given by Napoleon I. to one of his generals as a wedding present. The great ball-room is cut up into cubicles, and the house is fitted up as a school. The pupils pay 50*l.* per annum, and stay for three

months. They work one hour a day on the farm and six or seven hours in school. This place is more like our own large Agricultural Colleges, but receives a vast subsidy from the State; it is far above the reach of the ordinary farmer.

APPLICATION OF THE SYSTEM TO ENGLAND.

I have selected the four schools that might serve as models for England, I have tabulated the particulars as follows:—

	No. of Pupils.	Masters.	Salaries.
Trois Croix, near Rennes	27-40	8	£ 700
Sartilly	40	4	200
Neubourg	40	5	450
.. .. .	60	8	..

The last named, though most satisfactory, can hardly be taken as a guide, as so much help is given gratis; but the arrangement here made with a farmer to allow the pupils to practise on his land would save a County Council a great deal of outlay of money. Les Trois Croix is a fine school but costly. Sartilly and Neubourg seemed to me to afford the best models for

imitation in England. In each case the success of the system is due to the excellence of the Director. It would not be easy to find a master of an English National School who was able and willing to qualify himself as an agricultural teacher as M. Aubril has done, or anyone like M. Pargot, at Le Neubourg, who can both manage and instruct boys, and also make a farm pay the greater part of his salary. There are some endowed schools in our own country that have survived the purpose for which they were founded, and these might be utilised for schools on this model.

If a County Council were to start such a school for forty-five boys without any endowment, the expense to be faced would be—

Salaries	..	..	..	..	..	..	..	£	600
House and Land	..	..	..	..	..	..	..		300
									<hr/>
									900

or 20*l.* per head besides the 20*l.* for board. Each pupil after two years would have cost 80*l.* This seems high, but in France it is held that agriculture has been improved by the system. The instruction is not limited to agriculture. Mathematics (land measuring), history, geography, and French literature are taught, thus enlarging the minds and developing the intelligence of small farmers whose ordinary life affords them little opportunity for obtaining these advantages. A County Council would, however, have to decide whether the object of the school was to train labourers or farmers. If the former, more time should be devoted to practical work, and the lectures might be given by members of the County Council staff, each of whom might give one lecture a week. A superintendent, matron, and school-master, who would also superintend the work on the land, would be a sufficient resident staff. The cost of such a school need not be more than 600*l.* per annum; but as no labourer could pay 20*l.* per annum for his son, the cost would fall upon the County Council. If all turned out well the latter body would send forth every year twenty well-trained labourers of seventeen or eighteen, who might be received into farmers' families and soon rise to be foremen. Their education would have cost the county 70*l.* each; but they would be worth quite 5*l.* 5*s.* to 10*l.* 10*s.* per annum more than this on account of their training, and the extra wages and better position they would secure would tend to keep active and ambitious lads on the land. If the farmers wished their sons to benefit by this education, as would probably be the case, they would pay 20*l.* for board, receiving only instruction gratis; while the comradeship of farmers' and labourers' sons would be an advantage, if it did not, in the case

of the latter, lead to a too high standard of living. The great difficulty with respect to the labourers is the age. If you take them straight from school at thirteen, you must discharge them at fifteen—too early to get good places. If you refuse to take them till sixteen, they will have lost nearly all their school training, and their work will then be getting sufficiently valuable to make their fathers unwilling to part with them.

Farmers' sons could be kept at school longer, and their home life of farm-work would be a good preparation for the further training which they would receive. The expense of training them would be less, as they would pay something, and there would be more certainty of their utilising their education for the purpose for which it was intended. But, as this would leave untouched the problem of inducing intelligent labourers to remain on the land, it is not by such schools as these that that problem can be solved. We shall find, as they have found in France, that the only persons to whom we can extend this education are the moderately well-to-do or the poorer farmers, who might be received at from fifteen to eighteen years of age on passing a reasonable examination. If we can develop the intelligence and assist the enterprise of the hard-working race of farmers, we shall have done a service to agriculture that will fully repay the money expended on it.

In closing this article, I wish to record my gratitude to the Directors and other officials of the schools referred to for the kindness with which they received me and the readiness with which they assisted me to obtain the information I required.

V.—*The Evolution of Farm Implements and Machinery in the Past Sixty Years.* By JOSEPH DARBY.

A RECORD of the marvellous changes in rural life which have occurred within the memory of men still living reads almost like a chapter of romance. Human toil in almost every department of field work has been lightened, and mechanical inventions have made the entire business of farming more pleasant and less slavish.

CULTIVATORS, PAST AND PRESENT.

There are persons still living who can remember when no other ploughs were in use but cumbrous wooden ones ten or twelve feet in length, fitted with wrought-iron points, which had to be dressed now and then by the village blacksmith. The

mould boards clogged dreadfully in wet clay, and it generally took three or four horses, driven in a string, to draw the ploughs through the soil when the latter was at all adhesive. But they turned up the land somehow, and wooden drags and harrows fitted with iron spikes worked the surfaces when these were dry enough. With the aid of a roller to break the clods, these surfaces had to be worked again and again to obtain satisfactory seed beds. The field roller of olden times was the trunk of a tree fitted into a frame with shafts, and with iron studs fixed in the two ends of the roller in which the sockets of the frame worked. Mr. Parkes, who reported the earliest Shows of the Royal Agricultural Society of England, stated that the implements exhibited at Oxford in 1839 were "rude, cumbrous, and ill-executed, the work of village ploughwrights and hedge-side carpenters." Mr. Albert Pell states that an iron plough which the late Mr. James Howard, when a mere lad, had devised and caused to be made at his father's works, was considered a great curiosity at the Liverpool Ploughing Match in connection with the Royal Show of 1841. No ploughman could be induced to hold and guide the novel implement, so young Howard took off his coat, and, acting as ploughman, won a prize.

What a change from the old wooden plough to the modern three-furrow gang one, fitted with a seat at the back for the driver, who not only manages the implement, but guides the horses, three abreast! In the spring of 1896 I saw one of these working on the farm of Mr. J. T. Hobbs, at Maiseyhampton, Gloucestershire. The season, owing to heavy rains in March, was a backward one, and Mr. Hobbs informed me that he intended having another of these ploughs, as by their use work was facilitated and labour saved. By means of this plough, three horses and one man turned over at least $2\frac{1}{2}$ acres per day, whereas with the best of the single ploughs, three pairs of horses, with three ploughmen, could only turn over three acres. Mr. Hobbs said that his brother Robert, at Kelmscott, had three of these gang ploughs at work. Both farms are tolerably level and not of an extraordinarily heavy character. Mr. Richard Stratton, of the Duffryn, Newport, has, in an article in the Royal Agricultural Society's 'Journal,' expressed his appreciation of this plough, but he does not consider it well adapted either for stiff clay soils or for very hilly land. There is, however, a double-furrow plough which has been employed successfully, even on clay soils, for some years past. Mr. Merewether, the occupier of a Royal Prize Farm, near Rotherham, informed me that three horses and a man could do with it as much work as four horses and two men with single

ploughs. The soil of his farm was of a decidedly stiff character.

Another marvel of modern construction is the Chilled Digging Plough, which buries old sward or foul stubbles so very effectually that farmers who have used it prophesy that it will be the plough of the future. At one of the principal implement depôts, where these ploughs are by no means made a special feature, the writer was informed that they were sending out seven or eight per day to all parts of the kingdom, so that there is some probability of their superseding the common form of single-furrow ploughs. They are fitted with two coulter, the fore one being designed to pare off an upper slice to a depth from two to four inches, at the option of the ploughman, while the hind coulter raises from six to eight inches of clean soil. This is thrown uppermost, the top slice being deposited at the bottom of the previous furrow. If, as is alleged, the foulest land can be so turned with it that nothing but clean soil is at the top without the slightest danger of the weeds and twitch grass springing into fresh growth, this is indeed a boon, as it will materially diminish the heavy cost of surface-cleaning stubble land and coarse foul old leas. This has certainly proved to be the case when the ploughing has been done in the autumn, and a catch crop of vetches or rye been put in. Very foul stubbles thus treated, after growing a heavy catch crop, have been clean enough to grow swedes after a single ploughing.

Horse ploughs, single, double, and triple furrow, have long been manufactured on the turn-wrest principle, so that the ploughman, when the headland is reached, turns his implement on a swivel as he brings the horses round to go back in the furrow he has just made. The furrows are thereby turned all all one way, which, apart from the saving of the time occupied by walking on the headland when ploughing on the ridge system, is a great advantage in ploughing hill-sides.

By the storage of water for irrigation, numerous semi-barren moors and hill-sides and poor meadows have been made fertile and productive, and much more attention will probably be paid to irrigation in the future than has been the case in the past. A Gutter Plough, invented some forty-five years ago, has long been made, and with the additions of some recent improvements, is now patented by Mr. John Eddy, an implement manufacturer of Kennford, near Exeter, to carry out the Bickford system of irrigation, which is one specially devised for labour-saving, and also for preventing waste of water. Thus, on a Somerset hill-side, it was found that with an A-level and gutter plough a single labourer could mark out and cut the gutters required to irrigate four acres of meadow in three hours, a horse being

employed to draw the plough. The reduction in cost of laying out meadows upon the Bickford system, compared with the old one of cutting gutters by hand-labour, was at least three-fourths, or, according to estimates of practical agriculturists, as much land could be laid out and fitted for irrigation for 1*l.* as by 4*l.* or 5*l.* upon the old system, so that a great saving not only of money but of labour and time is effected.

Moreover, there is an ulterior economy conferred by the gutter plough, viz., the saving of the expense of annually cleaning out old gutters in land previously irrigated. Gutters which become choked, or are damaged by the tramp of cattle in wet weather, often cost 2*s.* 6*d.* per acre to repair by hand-labour, the man leaving a heap of refuse, which has afterwards to be removed, about every twenty yards. In cutting fresh gutters with the plough parallel to and close by the old ones, which can be done at a cost of 1*s.*, or at the most 2*s.*, per acre, the sods raised out of the new furrow are placed by the plough in the old one at its side and trodden in, and in this manner all the ground is made good.

There are the following further incidental advantages which the experience of forty years has proved to be gained by the use of this plough for irrigation. The smallness of the gutters enables mowing machines, rakes, haymakers, and carts to be worked or driven over the gutters without the slightest jar. The cutting of the fresh gutter each year by the side of the old one at a distance of ten or twelve inches not only saves the expense of cleaning, as mentioned above, but prevents the constant increase of size which is the result of cleaning, as may be seen from the immense size of many of the old gutters in water meadows laid out many years ago on the old system. Gutters sometimes reach a width large enough for a sheep to lie on its back in, and in haytime it is often found that large wisps of grass lie unnoticed in the gutters, and, not getting properly turned, find their way afterwards into the rick without being sufficiently dried.

The adoption of the Bickford system of laying out meadows with these small gutters, for which this plough is especially adapted, enables the meadows to be laid out in small squares, so that the water may be directed to any small part of the meadow with a facility which would be impossible under the old system without an immense amount of labour in cutting gutters and in the subsequent yearly cleaning which would be involved.

It should be added that, by a recent improvement to the plough suggested by Sir C. T. D. Acland, the plough may be used so as to cut a gutter with a perfectly level bottom even on a steep

ill-side, and to place the sod in the old gutter, either to the right hand or to the left, as may be required. The Bickford system, although it has been in use in Devonshire and Somerset for more than forty years, is very little known in other parts of the country. But the recent improvement just alluded to in the gutter plough is one which ought to render the implement a most useful one for farmers who appreciate the value of irrigation, inasmuch as it makes irrigation of meadows in any position, hilly or otherwise, an inexpensive and simple matter.

At one time it was thought that steam cultivation would supersede horse tillage as steam thrashing has abolished the flail, but this dream has not been fulfilled, although on many of the larger farms of the Kingdom, and especially those of a heavy character, cultivating by steam power has for a long time been habitually resorted to. But for medium-sized and small farms, the cost of steam tackle has been too great to admit of farmers purchasing it. In many districts, however, it is let out on hire, and in trying and backward seasons large numbers of farmers avail themselves of this. But ploughs and cultivators drawn by traction engines can only be used when fields are large. An important improvement in recent years in connection with steam cultivation has been the addition of a traction engine to Darby's Digger, which obviates the excessive pressure through the digger carrying the engine on its back. A new turn-wrest plough for steam cultivation was first exhibited by Messrs. Fowler and Co. at the Cambridge Meeting, in 1894, of the Royal Agricultural Society. The price is comparatively moderate, and the machine has four separate pairs of plough-shares, made to rise or fall with varying surfaces. Each of the eight plough-shares has two mould boards, one elevated while the other is ploughing, and these are reversed at the head-lands by automatic action on the turn-wrest principle.

PORTABLE STEAM-ENGINES AND THRASHING MACHINES.

Many old farmers can remember the time when, throughout the winter season, the thump of the flail was heard at almost every homestead. Before the century was thirty years old, however, a few of the largest farms were furnished with rudely constructed horse-thrashing machines. The agrarian riots early in the thirties were partly due to the strong antagonism felt by deluded agricultural labourers to the use of such machines, and, if the mob had the chance to act before the yeomanry arrived, the abhorred piece of mechanism was broken to pieces and burnt before the owner's eyes. By the labouring classes of those days it was deemed a crime for an employer to have any

labour-saving machine. They thought that machinery took the bread out of the mouths of those who had the right to earn it by the sweat of their brows, and there were many incendiary fires in the forties after the smaller one horse-power and manual thrashing machines had been brought into use. One of my most vivid remembrances is that of the paternal homestead being burnt to the ground in those days. One of the newly invented small thrashing machines had been placed in the barn, ready to be worked the following day, but before midnight some incendiary had fired the barn and the entire premises were destroyed.

Steam was destined to revolutionise not long afterwards almost everything appertaining to rural life. The success of the locomotive steam-engine caused a network of railways to be laid down over the face of the country, and congested populations began to move further afield. This and the general prosperity of manufactures in the fifties, coupled with the fact that labourers could earn much higher wages either in towns at navy work, or in the mines, occasioned great depletion of the rural parishes. The change did not come at all too soon, as pauperism was corroding the very heart of the rural community. The rapid improvement which took place in thrashing-machines and in the steam-engines for working them soon caused the flail to go out of use, even on the smallest farms. It was so much cheaper to thrash by steam-power that a new trade was established for letting out steam-engines and thrashers by the day, and those who had not sufficient corn to occupy the machine for a single day joined with their neighbours who were similarly situated in hiring a machine. The co-operation worked well, as the small men helped one another in performing the manual labour required.

The evolution of the steam-thrashing machine has been of a most remarkable character. At first the shakers and blast-power took out most of the dust and chaff, but the grain had to be passed through winnowing machines afterwards. Our highly skilled machinists soon perceived that they could combine with the thrasher even better dressing power than could be provided in the barn, so that very soon wheat became graded into three or four divisions by the same machine which had thrashed it. The bagging of the best corn was also made to cease as soon as a certain weight had fallen into the sack, when a bell rang and the labourer removed the full sack and hung up another in its place. Not content with this, some of our machinists have added a big chaff-cutter, so that by the same power which works the thrashing and dressing machinery the straw is cut into the length required.

Many a hard fight took place between our engineers before all these objects were achieved. We have only to review the contests at the various Shows to learn how fierce was the warfare and how eager was the desire for distinction among the most skilful and enterprising of the Agricultural Implement Firms. The portable steam-engine first appeared at a Royal Show in 1841, and the first "combined" thrashing machine two years later. Not until 1847, however, did the Royal Society provide tests for ascertaining the true value of such machines and to promote their improvement. Mr. Dan Pidgeon states :— "The portable steam-engine and thrashing machine began to attract abnormal attention about 1847." In 1842, Judges had, indeed, expressed serious doubts whether steam could ever be successfully applied to the driving of barn works, and as yet no one dreamed of out-of-door thrashing; but in 1847 seven engines and thrashing machines were set to work in the Royal Society's Yard. No tests were applied, and the proceedings evidently became alarming to all concerned, the machines being driven at much too high a speed, and one of them being smashed to atoms. But in the following year Mr. Amos and Mr. Thompson, with the newly-born dynamometer in their hands, put no less than ten engines and thrashing machines through their paces, only to prove that three-fourths of the power absorbed by the best barn-works were expended in driving the machinery, while only one-fourth of such power was utilised for the work of thrashing. Hence, from 1847 to 1851, a thrilling interest centred around the whole question of steam-thrashing, which only abated with the seeming comparative perfecting of the "combined machine" and the firm establishment of rick-side thrashing as common practice. The services rendered by the Royal tests are very evident. The Prize-Engine of 1849 was found to burn $11\frac{1}{2}$ lb. of coal per horse-power per hour, that of 1855 only $3\frac{3}{4}$ lb., that of 1887 $1\frac{1}{2}$ lb. per hour.

In 1881, an article appeared in the Journal of the Royal Agricultural Society by Messrs. Easton and Anderson, the Society's Consulting Engineers, which was the prelude for the fresh trials of portable steam-engines, which took place at Newcastle in 1887. This article was to the effect that compound engines were beginning, in the manufacturing districts as well as in ships, to displace simple engines, and that they appeared to possess some sterling advantages, causing less fuel and less water to be required, while the construction of the engine could be lighter. Mr. Dan. Pidgeon, who was the reporting Judge of the trials at Newcastle, considered that these trials were designed for the express purpose of ascertaining the advantages of compound over simple engines. In his report he says, in reference

to the desirability of economising water :—"Some used more than twice as much water as others, and, apart altogether from the question of the coal bill, this is a matter of the utmost importance. The water supply of farms is often scanty, and almost always distant from the points where motive power is needed. In the case of traction and ploughing engines, particularly, that motor is best which puts the least strain on the water-cart."

The Consulting Engineers, Sir F. J. Bramwell and Mr. Anderson, also gave an elaborate report of the Newcastle trials, and suggested two improvements needed in engines, viz. :—"Efficient clothing on all parts of the engine and boiler, even on the front of the fire-box, so commonly left, naked, and the desirability—with the object of saving the water supply—of condensing the exhaust steam."

The trials of Light Motor Engines at Plymouth, in 1890, seemed to show that these stand more in need of improvement than heavy engines. Messrs. Unwin and Pidgeon say, in their report :—"It would not have been difficult to indicate how an engine might have been built which would easily have been placed higher in order of merit than any of those exhibited." The small steam-engines require much more fuel in proportion than large ones, and the Petroleum Engines are gradually supplanting them. Two of the latter were exhibited and took part in these trials, and one gave great satisfaction to the Judges.

A trial of combined thrashing and dressing machines was carried out the following year at Doncaster, and no better proof could have been afforded of the great improvement which, during the nine years between the trials of Cardiff and Doncaster, had taken place in this class of machinery, than the fact that, whereas in 1872 there were two classes, the first for machines which had dressing apparatus combined with the thrashing adjustments, and the second for those which performed only thrashing, the latter kind "had practically disappeared" by the year 1890. There were as many as fifteen competing machines that did not dress at Cardiff, and no more in the other class ; but farmers soon discovered that time and labour were greatly economised by employing only thrashers that cleaned, and graded the grain. Mr. Anderson, in his report of the Doncaster trials, said that, in the final run with wheat, Foden's First Prize Machine thrashed 6,387 lb. sheaf-corn in 27·75 minutes, dividing the grain into 2,097 lb. firsts, 82·5 lb. seconds, and 18·25 lb. thirds. The power taken was 9·34 horse-power. "This was a most remarkable run," reported Mr. Anderson, "as less than 230 lb. of corn per minute were fed into the machine without the slightest sign at any time of choking, the machine

running perfectly steady. The wheat was well thrashed, a good sample of barley was produced, and good work was done in the trial with oats."

The cost of thrashing wheat by the flail, and of preparing it for market by winnowing, has been appraised at 4s. per quarter. Mr. J. Evelyn Denison, at the time of the French Exhibition, stated that the work could be just as well performed by the combined thrashing and dressing machines then in use for 1s. 6d. per quarter, and that to the farmer who had 200 quarters to market, the saving would be 25*l.*, or 2s. 6d. per acre. There has been an enormous amount of labour-saving in well-nigh every department of farm-work, especially in cutting and harvesting corn by the sheaf-binder, where the saving is at least one-half.

CORN AND SEED DRILLS, HORSE-HOES, POTATO-PLANTERS, &c.

Another class of implement for the seeding and treatment of crops while in a state of growth claims attention. Although Jethro Tull is justly considered the father of the British drilling system, as he invented a drill for the deposition of wheat, there was very little drilling, even for seed corn, when the Royal Agricultural Society was formed in 1839.

Corn and turnip drills are in fact almost as modern as portable steam-thrashing machines. Mr. Pusey wrote thus about them in 1839:—"The use of the drill-machine, by which seed is laid in regular rows, has lately become frequent in Southern, as well as in Northern England, although it has established itself so slowly, that for a long time travelling machines of this kind have made yearly journeys from Suffolk as far as Oxfordshire, for the use of those distant farmers by whom their services are required."

These Suffolk drills, which were then novelties and deemed worth hiring from even a great distance, have long since been thrown aside as far too cumbrous for general use. They took three or four horses, driven in a string, to work them, with a man to manage the horses and another to keep the machine in order. The drill now in use is as wide as its predecessor, but, being constructed mostly of cast-steel instead of wrought-iron and wood, it is of much lighter draught. A pair of horses, side by side close back to the machine, can now be driven by the drill-man with reins, with the result that more land is seeded in a day than was formerly the case when a larger number of horses and an additional man were employed.

Moreover, it is found very advantageous in some districts to employ a steerage drill, by the use of which the rows of corn are straighter. A steerage horse-hoe of equal width, with the tines

perfectly adjusted to the intervals, may be worked even when the corn-rows are only eight inches apart. On lands addicted to charlock, the advantage of being able to horse-hoe barley put in by a steerage drill is exceedingly great. Myriads of this annual pest are thus cut out in a few hours, causing the labour of hand-weeding to be comparatively light.

Great improvements have also been effected in the construction of turnip drills for the distribution of chemical manures. These, like the corn drills, were at one time far more cumbersome than now. If the manure compost is only in dry and finely divided condition, a large area can be seeded and manured in a given time with much fewer horses and men than formerly. The triumph of mechanics in making case-hardened steel malleable has enabled all kinds of field implements to be constructed lighter, without detracting one iota from their strength and durability. This, by economising the cost of cultivation, has naturally proved a great boon to arable farmers. The adjustments to obviate clogging are also more perfect in the modern complicated manure drills than in the older ones, and the feed is consequently more regular. But the greatest improvement in modern drills is the alteration whereby they deposit regularly and in smaller quantities, thereby minimising the bulk of ashes required.

- Water drills are almost as old as those which deposit solid manure compost, for machinists very early applied themselves to meet the wants of occupiers of peculiarly arid soils, whose turnip crops at a time of drought depended on the seed being deposited in an artificially-made moist bed. The artificial manure can be more evenly supplied to the land in a liquid form by the water drill than by being mixed with ashes and deposited by the ordinary turnip drill. Although of course there would be no utility in minimising water in a droughty season, it would be a great advantage to have a drill that could be so regulated as to work with a small quantity of water, which would be a saving of carriage in rainy or showery weather.

Even potato sets are now deposited by a drill, fitted with a revolving cylinder of spikes to take up tubers from the hopper, just as revolving cups take up wheat or barley from the seed-barrel. Each of the spikes in revolving strikes into a potato set, which falls into the coulter as it passes over. Sometimes the spike may not take sufficient hold of the set; but those practically acquainted with the working of the best of these machines state that there are surprisingly few misses. The saving to large growers in the cost of planting is, of course, very great, and it is no wonder that trials should be organised

and heavy premiums offered for such machines. There is little field work, however arduous or difficult in accomplishment, including every phase of potato culture, from planting to digging, that our agricultural machinists have not been successful in materially lightening and rendering less costly by substituting either a horse-power or a steam-driven machine for manual labour.

There was a trial of potato-planters in April, 1896, at Leicester, for prizes offered by the Royal Agricultural Society, and the reporting Judge, Mr. J. McConnell, stated that every planter was tried with three different sizes of seed—small, medium, and large. When it was found that they answered by far the best with the medium-sized, Mr. McConnell observed: "This, I think, is a good feature, as no doubt a medium-sized potato is the best to use. When the potatoes were suitably shaped, most of the machines made a good job of the planting, but when the potatoes were long and badly shaped the machines could not work so well." The soil was described as "a stiffish clay." As the result of the competition, Messrs. Ransomes, Sims, and Jefferies were awarded first prize for their two-row planter, and second prize for their three-row one, both being fitted with apparatus for planting on the ridge as well as on the flat. The prices of these machines were respectively 20*l.* and 24*l.*

Horse-hoes are as numerous in variety as drills, and to give anything like a comprehensive description of the different features of all of them would occupy more space than is at my disposal. Suffice it then to state that one and all save an immense amount of manual labour. In fact, it would be impossible, in the present state of the labour market, to carry out our modern systems of cropping without drills and horse-hoes. The latter are pre-eminently useful for stirring the intervals between the plants so as to admit the air to the growing roots, and provide facilities for the rootlets to obtain moisture.

HARVESTING MACHINERY.

The inventions of modern times have done much to ensure the economical harvesting of well-nigh every kind of crop. Alike in the mowing and conversion of grass into hay, the reaping and sheaving of corn crops, and the digging of potatoes, the agricultural engineers and implement makers have provided farmers with truly invaluable machines.

The saving in labour effected by harvesting machinery can hardly be over-estimated, while, in diminishing the risk of crops being damaged or spoiled by adverse changes of weather,

a still higher boon has been conferred. Troops of men, women, and children used to be sent into the hay-field to turn the drying fodder, but often, just as it was fit to be gathered for stacking, there would come a downpour of rain. Such a disaster may even attend the more rapid processes of drying and gathering, but if equipped with a mowing and a haymaking machine, together with a horse-rake, the farmer is able to take the fullest advantage of fair weather, and so secure ten-fold more produce in a given time than he could possibly have done without such appliances.

But these are not all the beneficial results derived from improved machinery. In the old times much grass and corn were spoilt before the crops could be cut. The hands available were often altogether inadequate to cope with rapid ripening, and the saccharine juices of the ripened plants were converted into woody fibre long before the mowing of the grass could be effected, causing a loss of quality seldom sufficiently estimated. In the case of corn, this delay was fraught with still greater sacrifices; for, in addition to the deterioration in the straw when required for fodder, the grain of wheat got "horny," and there was a thick coating of bran and a consequent loss of flour, while, worse still, in the case of oats, a large proportion of the grain got thrashed out by winds before the standing crop could be dealt with.

The rise, progress, and perfecting of machines for mowing and reaping were notable features in the agricultural history of the sixties and seventies, and the Bath and West and Southern Counties Society did much to promote the revolutionary change by providing trial fields and crops near its Show-yards, so that implement makers might publicly exhibit their machines at work. Some of the older Members of the Society will recollect what keen interest spectators appeared to take in the performances of the various machines, especially at the Salisbury Shows of 1866 and 1867, at Southampton in 1869, and at the subsequent trials at Taunton, Guildford, Plymouth, &c.

In an old report of mine on one of these Shows, this statement appears:—"During the past eight or ten years mowers and reapers have been all the rage. The demand for them still increases, and in all probability is still likely to increase for many years to come. In no other department of machinery, except steam-thrashing, have implement makers been enabled to serve the interests of practical agriculture half so well. It is because these invaluable implements are calculated to save a vast amount of manual labour when the latter can only be obtained by paying a heavy premium, that they have become absolutely indispensable. The farmer who would

arvest his crop at the right period, without waste or extraordinary risk of damage, and untaxed by those heavy costs scarcity of labour entails, has but one resource, and, thanks to the Bath and West and Southern Counties Society's trial grounds, no farmer need remain ignorant at the present day of the sterling advantages this class of machinery can confer on him."

The self-delivery principle, which had only just been successfully added to the two-horse reaper when the above was written, was followed by the self-binder; and a further saving of from 1s. to 8s. per acre for labour was the result of this invention, since the farmer can now dispense with tying sheaves by hand. Here, again, the actual cheapening of the process, great as it is, must be regarded as only one portion of the sterling advantages derived. The hands, set at liberty from sheaf-tying, can be employed singling out turnips, or performing any other work of pressing importance; in the past, many a turnip crop was retrievably spoiled, on account of the impossibility of sparing hands in harvest time to single the plants at the proper period. Further, when there was no self-binder, showers of rain frequently interfered, after the corn had been cut, with hand-tying, causing delays, always harmful, and sometimes disastrous. When corn is fit to cut, the sooner it can be sheaved and placed in stack the better, as, according to the testimony of practical men, there cannot possibly be any greater advantage than that of accelerating harvest work in every possible way.

In the days before reaping machines, farmers were accustomed to accelerate harvest work by letting to their men the cutting, tying, and even the carting and stacking, at so much per acre for everything, and after the first machines were adopted they found it advisable to continue the practice for the sake of expediting operations, the men being allowed the use of machine, waggons, horses, and whatever appliances there were on the farm. They did much more in the day by this system than when they were paid by the day, and, although it cost more per acre, the farmer considered himself well repaid, as harvesting was more rapid, and the risk of damage by change of weather was lessened.

How much greater must now be the advantage to those who are provided with self-binding machines! A man seated on one, gives the horses with reins, and manages the machine at the same time, and, as the sheaves fall off the platform of the machine ready-tied, there is nothing to be done by the labourers but to attendance but to stook them until they are fit to be carted to stack. Not only has the actual cost of cutting and tying been lessened two-thirds by the self-binding reaper, but the saving in time has also been great. Some farmers state that

they can now do as much harvesting in a fortnight as they formerly could in a month. So many firms are engaged in turning out really efficient machines of this class that, under ordinary circumstances, the supply is equal to the demand.

Haymaking machines and horse-rakes, to follow in the wake of the mowing machine, have been found pre-eminently valuable. They lessen the great amount of manual labour, which used to be absolutely indispensable, even after the grass had been mown, to bring the fodder into condition for carting and stacking. The early mowing machines were very imperfect in comparison with the present ones, and their improvement may be said to have gone hand in hand with that of reaping machines.

The latest trial of haymakers for prizes given by the Royal Agricultural Society took place at Darlington in 1895, and the report of the Judges was rather disappointing, as it seemingly led to the inference that a great deal of improvement yet remained to be made in horse haymakers, because they did not do their work effectually on uneven ground. Notwithstanding this drawback, haymakers are necessities, owing to the scarcity and high price of labour in rural districts. As the reporting Judge, Mr. C. W. Tindall, truly observed: "Haymaking is always a seriously expensive process, and much more costly per acre than corn, unless the weather is perfectly fine; therefore any good machinery which can hasten the making, and lessen the cost, will always well repay the inventor and maker, to say nothing of the grower."

Mr. Tindall said the Judges were disappointed at not finding any new machine for putting hay and clover out of sward into wind row, adding, "There is a great want of a labour-saving machine for this purpose, and we look forward to seeing one brought out arranged something like three or four furrow ploughs to work backwards and forwards, putting, say, eight rows into one." This work is often performed by a horse-rake, and, when the fodder is dry enough, much labour is saved by pulling it together with the rake.

No labour-saving appliance is more highly appreciated on the farm itself than the stacker or elevator. It is placed in front of the rick which is being built, and is set in motion by a pony going the round of a small "gear-work," which carries up and delivers to the top of the highest rick, hay or corn thrown on it from the loaded carts and waggons. Farm labourers who complain that other harvesting machinery deprives them of the means of earning a living, are never heard to say a word against this contrivance, for it relieves them of the severest exercise of muscular power required of them in harvesting. Those who in golden days had the opportunity of witnessing the unloading of

ly on a scorching day, when the stack got high, can readily understand how it happens that the labourer deems the elevator friend instead of an enemy. The farmer, as may be supposed, derives his advantage in the more rapid accomplishment of the unloading.

Numerous contrivances have been invented for raising potatoes from their beds, in order to obviate hand-digging and to cheapen the harvesting. Some of the earliest were termed potato-ploughs, but the more appropriate names of potato raisers and diggers have now been given to most of them. They have none and all proved more or less effective when the soil is sufficiently dry to crumble away from the tubers, but when the land is saturated with moisture the earth naturally adheres, and there is great difficulty in getting even the best of them to work efficiently. This, however, only proves the necessity of potato harvesting, even for the main crop, not being delayed so late in autumn and of choosing dry weather, if possible, for the operation.

STOCK-FEEDING INVENTIONS.

Food-preparing machinery has also undergone many, and, in some instances, marvellous transformations. Take for instance the numerous contrivances for reducing turnips to slices, finger-pieces, or pulp. There was a time when the beasts had to gnaw the roots whole, and sheep have to do so now sometimes, when their owner has no cutter. There is a picture familiar to many of "the white heifer that travelled" in its caravan, with the old cattle-man seated by a heap of swedes, cutting them up for her with his pocket-knife. Before the age of these machines, a turnip-cutting stool was invented, having a big slicing knife affixed to a hinge at one end of it, and a basket underneath to receive the slices.

Those old enough to remember the first introduction of Gardner's Turnip Cutter, about fifty-five years since, will bear testimony how eagerly it was welcomed. Gardner very early met the wants of flock-masters and cattle-feeders by bringing out a combined machine which would slice roots for cattle, and by this machine, if the action were reversed, what are commonly termed "finger-pieces" could be cut. Sheep require small pieces for rapid mastication, but it was found that these would not do for beasts, owing to the great danger of the "finger-pieces" being swallowed whole and sticking in their throats. The combination principle was carried out to a still greater extent when root pulpers were invented. Messrs. Hornsby exhibited at Milburn a new Convertable Pulper, Slicer, and Cutter, and the machine could be constructed at a less cost to combine pulping

with slicing only for cattle, or pulping and cutting for sheep. Other inventions have for their object the execution of a larger amount of cutting or pulping in a given time. Messrs. Samuelson invented in the eighties a twin-barrel cutter, to reduce the root on both sides simultaneously by means of the barrels working inwards reversely. The pulping machines have proved quite as advantageous to farmers as the slicing and cutting ones, if not more so.

When roots are scarce, owing to drought and bad crops, they may be sparingly eked out by mixing a small quantity of pulp with a larger bulk of cut straw, the former being sufficient to impart a relish. Of course soups of meal infusions or those of sugar or treacle may be also necessary to sustain the animals in condition. The ability to utilise small quantities of roots in this way is very advantageous. Many dairy farmers who have to feed large numbers of cows yielding milk in winter find it economical to pulp mangolds, and to mix the pulp with hay and straw chaff; and the same system is often resorted to in the feeding of horses. If the chaff-heap be previously damped so as to ensure an active fermentation after mixing, a very agreeable flavour is imparted, especially to the straw chaff, which, through such fermentation, is rendered far more digestible, more of the nutritive properties being assimilated.

That most valuable implement, the chaff-cutter, has been gradually brought to its present stage of usefulness. In the earlier inventions cylindrical knives were employed, giving either an intermittent or continuous cut. Gillett brought out a machine in 1846, with an oscillating knife, moving vertically up and down in guides like the blade of a guillotine. Cornes' machine, invented in 1847, had its knives arranged radially, cutting from the centre outwards. To quote Mr. Dan Pidgeon: "Later improvements have consisted chiefly in details of construction, in the application of the chaff-cutter to the thrashing machine, whereby the chaff is cut and bagged as fast as it issues from the straw shaker; and in the addition to these machines, of arrangements by which, should the feeder get caught in the feed-rolls, his body being drawn forward presses against the lever which throws the machine out of gear and ensures the man's safety."

The number of corn kibblers, grinding mills, and oil-cake breakers which have been introduced for the economical and proper feeding of stock, is beyond description. Well-nigh every implement maker has had a hand in manufacturing them, and, with chaff-cutters, they form by far the largest proportion of implements appearing at Shows. Passing oats through a crusher before they are given to horses ensures a much larger

amount of their nutritive properties being assimilated. The oil-cake breakers save a considerable amount of manual labour, as the cakes have to be broken up somehow before they can be utilised. Again, the farmer who possesses one of the modern roller-mills can grind his barley and other grain, and thus save the labour and delay of sending it to be ground by the miller at a distance. He also saves the grist money, no small consideration when a number of pigs are being fed.

On all medium-sized as well as large farms, it is of course very advantageous to have these food-preparing machines arranged in a loft or lofts so that they can be worked, either singly or two or more of them together if required, by steam, horse, or water power. Nor is wind power altogether obsolete, while not a few farmers make use of small oil or gas engines. The larger number of farmers have, however, to depend on horse-gear work, and in numerous cases the machines have to be worked by hand. Throughout the cider counties, the grinding of apples is an important part of the work at the farm homestead in the last three months of the year, and the same contrivance which is used for grinding the apples can be made to do duty for the above-mentioned operations. Cider mills have been vastly improved since the middle of the century. In Herefordshire, the old method of crushing the fruit beneath a revolving stone still survives, and some farmers are said to prefer it because they think crushing the pips imparts an agreeable flavour to the cider.

This is no digression, for the grinding of apples is to some extent an operation to provide food for stock, as well as a beverage for the human palate. The must or pomice residue of the cider press is almost as rich in nutritive property as the pulp of roots, and, although it was once wasted, provident farmers now take care to stack or otherwise preserve it for winter feeding.

MACHINES FOR PREPARING PRODUCE FOR MARKET.

In olden times, the simple rough contrivance of a fan on stocks was the only method of blowing chaff and dust out of corn. A circular frame, to which strips of sail cloth or canvas were nailed, formed the fan, which after being placed on the stand was made to revolve quickly, so as to produce a strong wind, by a man turning a handle. Another man standing in front with a sieve, full of the unwinnowed grain, worked the sieve with his hands, so that its contents fell out gradually to meet the blast. This, and the after grading by means of hand sieves, were well-nigh the only resources until winnowing

machines came into fashion. These saved much manual labour, but they were at first rough in construction compared with what they are now.

Almost all implement firms have their corn-dressing machines and barley screens—the latter being of great use for taking out light and broken grain. Machines of the latter kind are absolutely indispensable; but dressing machines for other corn are not so much used since the combined thrashing and finishing machines have been able to render good, graded samples. But the travelling machines do not always perform the latter operation satisfactorily, so that a great deal of other corn besides barley has to undergo some manipulation in the barn in order to put it into proper condition.

For purifying smutty and dirty wheat, and at the same time ridding it of stones, Messrs. E. R. and F. Turner have provided a most ingenious and valuable contrivance, by which the wheat, as it is fed gradually into a circular trough full of water, is perfectly washed by powerful agitation, the stones sinking to the bottom, whilst the wheat is carried over the sides of the trough to a whizzer to abstract moisture, after which it can be elevated to a conditioner for perfect drying. This combined washer, dryer, and conditioner is in use at Messrs. Webb's flour mills at Wordsley. Farmers are at a loss how to cleanse smutty wheat, and as a rule grind it for pigs. If a wheat conditioner were stationed in every corn market to be worked by farmers paying a small fee, it would be a great boon in damp autumns.

It is a great advantage to those who market hay and straw to be able to compress these products into the least possible space, especially when they have to be conveyed by rail or boat. Mr. Dan Pidgeon, who reported the elaborate trials at Nottingham in 1888, remarked: "The shipper who pays freight on measurement, makes his bales as dense as he possibly can, while the English farmer who has no foreign markets aims only at getting 50 cwt. of straw or hay into a railway truck, thus securing the lower rates at which compressed hay or straw are carried by the railways of this country. A density of 2 cwt. to the cubic yard, or 8·3 lb. per cubic foot, is more than enough for this purpose." The presses on trial were found to do this readily, but differed materially on other points of merit. Mr. Pidgeon has elsewhere expressed the following opinion: "A number of excellent hand-power presses are now made in this country, notably by Barford and Perkins, which are more useful for the purposes of the tenant farmer than larger machines."

There is probably another valuable service which these

ses are calculated to render, for Mr. R. Neville, in reporting one of them which received a silver medal at Derby, stated: Mr. Scotson, one of the Judges, held a strong opinion that though its agency hay may be secured from the field in a drier state than when ordinarily stacked and sweated according to ordinary practice. The fact of the hay being so closely packed would, by excluding the air, prevent heating. One machine, capable of pressing $2\frac{1}{2}$ tons per hour, could deal with a crop as rapidly as by ordinary stacking. The hands employed would be less numerous, and when the market is the situation such a scheme seems very practicable."

Improved dairy appliances have entirely revolutionised the butter trade during the past thirty years, and unfortunately British producers have suffered severely in consequence. The value of the foreign butter imported in 1897 was 15,916,911l., whereas in the sixties scarcely any came here. The statement has been made that not one-hundredth part of the butter consumed in London is home-produced. When mechanical separators were first invented, the Danes at once took advantage of them, seeing that, by abstracting the cream as soon as the milk had been taken from the cow's udder, butter could be produced capable of keeping perfectly sweet for weeks and even months. Owing to the factory system, foreign butter is of more uniform quality than that produced by many British farmers.

The cream separator was only the first-born of a numerous family of improved dairy appliances. At Leicester, in 1896, prizes were offered for butter-driers, and eight machines competed. Those of Messrs. Lister, the Dairy Supply Company, Messrs. T. Bradford and Co., won prizes, preference being given to the machine exhibited by the first-named firm. But the latest novelty was an ingenious piece of mechanism for not only drying the butter, but for moulding, printing, and weighing it. The machine received the butter from the churn and delivered it in weighed quantities suitable for marketing. The Stockholm Radiator professes to do a great deal more than this. The apparatus, which is on a large scale, receives raw milk, pasteurises, cools, and separates the cream, churns the latter into butter, delivers it to the operator, and sends the separated milk and buttermilk to tanks outside, all at one and the same operation. A hand-power Radiator can now be obtained for 45l., and according to the report of the Judge at Birmingham, "it skimmed and churned 10 gallons of milk in 10 minutes, leaving only 0·11 per cent. of butter-fat in the milk."

Of equally ingenious construction are the cow-milking and sheep-shearing machines, but at present their cost practically

prohibits their use except on farms where there are large dairy herds or flocks.

At Darlington, a silver medal was awarded to the Thistle milking machine, and the reporting Judge stated, "most important in every respect is the milking machine, which attempts to deal—and we believe does so successfully—with one of the pressing agricultural problems of the day." "Cows were tried which had never been thus milked before." Two had the reputation of being kickers under hand-milking, one of which kicked "once or twice and then settled down quietly." The other had "bottle-shaped teats, too large for cups on hand." The two quieter ones "stood as if they had been used to the operation all their lives," and Mr. C. Marshall, the Judge, further stated, "with the three, the trial was most satisfactory, as they were quickly and thoroughly milked."

A trial of sheep-shearing machines took place at Chester, and Messrs. Anderson and Smith, after awarding the first prize to Messrs. Burgon and Ball, reported, "The quality of the work done was all that could be desired. There was but little wounding of the sheep, the cutting was uniformly close, and there was little waste of wool. The cost of shearing by machinery can only be economical where large numbers of sheep have to be dealt with, and the cost of the power (when not water) may be spread over several machines working simultaneously. The apparatus, driven by a small petroleum engine or by a horse, would seem to be well adapted for going on hire about the country."

Fruit-drying machines appear to be making way, as they should do. Americans have derived great advantages from them as well as from their apple corers and slicers.

MISCELLANEOUS.

There are besides a large number of highly serviceable modern inventions and some interesting novelties which do not exactly fall under any of the foregoing classifications. For instance, although stock are, or should be, weighed before being marketed, the farmer's weighbridge is not a market-preparing machine in the ordinary sense. But in giving the farmer the exact live weight of his stock, it performs invaluable service, and it is highly satisfactory that there are so many weighbridges and machines. Pooley's has a dial-plate to declare the weight the moment the animal enters the pen and stands on the bridge, and McJannet, who has done so much to advance the question of selling stock by live weight, has invented a farmer's weighbridge for loaded carts as well as for live animals.

Messrs. Ben Reid and Co., Aberdeen, have received a silver medal for a farmyard manure spreader, drawn by a horse; and Messrs. R. Boby and Co., Bury St. Edmunds, one for a machine for taking plantain out of clover seeds, of which the Birmingham judges reported, "We tried it on a very foul sample of clover which it cleaned in a most satisfactory manner." Messrs. Lister have successfully introduced a simple adjustment to be fitted in front of any ordinary chain-harrows, which saves the labour of a man preceding the harrows when grass lands are dressed, to level mole-hills and the dry droppings of cattle. The adjustment breaks up the hard blotches, so that the chain-harrow distributes them.

Messrs. Ransome last season exhibited for the first time a pasture-cultivating plough, for cutting the turf two or three inches deep, stirring the under-soil, depositing any manure required, and relaying the turf by simultaneous action. The inventors claim that paring up the turf kills all deep-rooted weeds, and if it destroys thistles it may prove valuable for poor pastures, but it would scarcely do to try it on those that have any large quantities of cocksfoot, tall fescue, or the deep-rooted clovers. Presumably, therefore, it is only intended for the worst class of grass lands.

Spraying machines have long been known for hops, and just before the Jubilee meeting of the Royal Agricultural Society at Windsor, Mr. Strawson brought out his machine to rid young turnips of the fly. The implement, now generally known as the Strawsoniser, has since been greatly improved. It is particularly serviceable for spraying potato crops when affected by blight, and is used largely for this purpose in Ireland. For potato growers, who cannot afford to buy a machine, and also for hop growers, Mr. Strawson has provided a small knapsack sprayer. The labourer carries the can containing the liquid insecticide on his shoulders, while from the bottom of the can a piece of gutta-percha tubing brings the insecticide to the sprayer held in his right hand.

Another serviceable implement is Messrs. Barnard and Lake's thatch-making machine. The labour of drawing out straw straight and binding it into thatch bundles is very tedious, and has too often to be performed in a busy time. A great many large farmers now, however, substitute galvanised iron rick covering for straw thatch, as the pieces can be readily strung one on the other, and being light a rick can be securely covered in a few minutes.

The Simplex refrigerating and ice-making machine of the Dairy Supply Company received a silver medal at the last Dairy Show, and will probably prove a boon, not only for refrigerating

in large dairies and butter factories, but also for use in preservation of meat and other perishable products. The principle is a greatly-improved adaptation of the ammonia-absorption system, with an entire absence of wearing movable appliances. Steam has to be provided, and the heat of the steam causes ammonia to circulate.

Among other novelties of recent invention is one for the serviceable work of gathering stones from the surface of fields. When tried at one of the big Shows, it was considered that only needed some improvement in mechanical details. The major part of the stones, but not the whole of them, were gathered and deposited in a receptacle. Still even this would be a great help on soils where considerable hand-picking of stones is required in the spring.

Among machines that have not made satisfactory headway are the mechanical turnip-thinners. One of great promise was introduced to the trial fields of this Society by Messrs. Kenyon of Cashmore, as long ago as 1867, and, so far as bunching plants was concerned, did its work perfectly. To have a machine to single out turnip-plants as well as it can be done by hand, is perhaps an impossibility; but in a busy time turnip-bunchers would be very acceptable to large growers and save many a crop from injury.

Other ingenious devices have been exhibited at Shows for gathering hay up in the fields and sending it by an elevated waggon; for collecting potatoes, in the wake of the potato-raiser, after they have been laid on the surface, and for top-dressing and lifting swedes and other roots for harvesting. These, however, have not been sufficiently perfected, or are too expensive to meet the popular demand. At any rate, they have not come largely into use, and the same may be said of draining, ditching and pond-excavating machines.

There have been some remarkable inventions for draining. The first important attempt was that of McEwen, improved upon afterwards by Alexander. A furrow was opened 18 inches wide, 14 inches deep, by a draft of twelve horses, a second implement coming after to deepen the channel 10 inches more. Steam-power was subsequently applied, and as by the latter improvement it was found possible to get a channel 28 inches deep, there would seem to be no reason why a traction-engine should not successfully work such a channel-opener.

The mole-plough, which also requires great power to work, forms small channels in the soil by means of a pointed iron fixed to a strong coulter. It has been found to answer, especially in sub-soils of tenacious clay, and Mr. John Fox in 1852, took out a patent for placing strings of pipes

the channels. Mr. Eddington made this so far a success in 1862, that it would lay pipes well where there was a decline in the land. Robson's machine, as exhibited in 1881, scooped out a channel with its fore-part, raised the earth into buckets to be automatically passed, when filled, to the rear; deposited the pipes carried in the body of the machine, and placed the earth over them at the rear. Mr. John Coleman, after pronouncing this piece of mechanism to be very ingenious, reported: "Provided the proper fall can be ensured, which has always been a great difficulty with drain-ploughs, this machine may prove of great value. Nothing in the way of mechanical aid to suffering agriculture can be conceived of more value than a really efficient labour and money-saving drainage tool." Its price was then, however, 390*l.*

Fowler brought out a steam-ditching machine in 1871, and, in 1885, a more powerful excavator for use on the Continent. Costly machines for special, extraordinary purposes have not been very saleable in this country since depression came; but whenever there has been a want for any mechanical device to save labour, our engineers have shown that they endeavour to supply it, and, indeed, they have, in most cases, forestalled the demand. No one can tell at present how far electricity and the motor system combined will in the future revolutionise haulage and cultivating operations on the farm, for the inventive genius of the engineers apparently never sleeps. To them we may truly apply Tennyson's inspiring words:—

"Men, my brothers, men the workers, ever reaping something new;
That which they have done but earnest of the things that they shall do."

VI.—*Dairying in Cornwall.* By JAMES McCREATH, F.H.A.S.,
F.C.S.

CLIMATIC ADVANTAGES.

ONE of the most notable features of the county of Cornwall is the mildness of its climate. Accurate observations have proved the mean temperatures at the seaside towns of Falmouth and Penzance to be but one degree lower, during November, December, and January, than at Florence and Montpellier. The geniality of the Cornish climate affords great advantages to the dairy industry of the county, for, not only does it ensure an abundant growth of herbage practically all the year round,

but it also admits of the stock being kept out in the fields a longer time than in other parts of the country, thereby considerably lessening the cost of artificial feeding, and, therefore, the cost of winter milk production. Needless to say, the present Cornish farmer is fully alive to the advantageous circumstances with respect to climate, in which he is placed.

THE FARMS AND STOCK.

Geologically, the county is mainly occupied by the shales, locally called "killas," of the Lower Devonian system, with isolated masses of granite in the Land's End and St. Michael's Redruth, St. Austell, and Bodmin Moor districts. The dairying is practised to a greater or less extent throughout the whole of the county, yet it is only in the granite districts and particularly those in the western part of the county, where the high-lying soils yield a comparatively scant but highly nutritious herbage, that dairy farming predominates.

The majority of the farms in the granite districts are small, many of them little more than crofts—and there seems to be an ever-increasing tendency to divide up the larger holdings on the expiration of leases. (In other parts of the county, Newquay district and North Cornwall, farms are larger.) The following statement, published in the year 1885, shows the number and proportion of farms of various sizes, but the portion of small holdings has increased since that date:—

NUMBER AND PERCENTAGE OF FARMS OF DIFFERENT SIZES

Size.	Number.	Per Cent.
From 5 to 20 acres	4,136	40·9
„ 20 to 50 „	2,503	24·7
„ 50 to 100 „	1,735	17·2
„ 100 to 300 „	1,611	15·9
„ 300 to 500 „	122	1·2
„ 500 to 1000 „	11	·1
Above 1000 acres	2	..
	10,120	100·0

It may safely be said that, at the present time, about half the dairy farms of the county are from 5 to 25 acres only in extent.

The dairy herds, taking the county all over, are consequently small, but in the western district herds consisting of as few as thirty animals may be found. A point of particular interest regarding the Cornish dairy herds is that few of them

posed of pure-bred animals. By far the most common cow of the county is a peculiar brindled animal of what known as the old Cornish stock. It is the result of various crosses—of what breeds it is difficult to say—but the Channel and Friesian cattle seem to have been freely used. The breed is exceedingly hardy and well adapted to the county, and, notwithstanding the somewhat uncomplimentary remarks which have been passed upon it by people who have not had sufficient opportunity of determining its merits or demerits, it is greatly deservedly in favour. It produces, as records show, a large yield of milk of excellent quality, and there is probably no breed that can beat this old Cornish one for the quality of the cream produced from the milk. In many herds pure-bred Guernsey bulls are now used, and the result is a really first-class dairy animal.

While the majority of the dairy herds are made up of the above-named animals, there are some splendid herds of pure-bred cattle in the county, amongst which the Jersey herd of John Tremayne, of Heligan, St. Austell, the Shorthorn herd of Mr. Hosken, of Hayle, and the great South Ham herd belonging to Mr. Coryton, of Pentillie, which numbers over 100 animals, may be specially mentioned.

In showing the capabilities of a few representatives of herds in the western part of the county, the following record of weighing trials conducted at the recent Penzance Show of the Cornwall Agricultural Association is here given:—

MILK RECORDS OF CORNISH DAIRY COWS.

Cow.	Owner's Name.	Points for appear- ance.	Weight of one meal's milk.	Points for milk.	Butter- fat.	Points for Butter- fat.	Total Points.	Awards.
		Max. 30	lbs.	Max. 40	percent.	Max. 50	Max. 120	
.. ..	John Saundry ..	15	15½	18	4·8	34·3	67·3	
crossed ..	.. ..	15	16	20	3·7	26·4	61·4	
Jersey ..	.. ..	25	12	14½	6·5	46·4	85·9	C.
crossed ..	.. ..	15	10	12	7·0	50·0	77·0	
.. ..	Solomon Richards	25	26½	32	6·4	45·7	102·7	1
Jersey ..	T. B. Bolitho, M.P.	30	23½	28½	5·2	37·1	95·6	4
.. ..	W. E. Richards	15	21	26½	6·0	43·0	83·5	
crossed ..	P. H. Rowe ..	20	17	20½	3·2	22·9	63·4	
.. ..	T. Robins Bolitho	30	20	24	6·0	43·0	97·0	3
.. ..	.. ..	30	20	24	2·2	15·7	69·7	
.. ..	W. J. Hosken ..	25	23	28	5·1	36·4	89·4	V.H.C.
.. ..	.. ..	28	23½	28	4·4	31·4	87·4	H.C.
.. ..	.. ..	30	33	40	4·4	31·4	101·4	2
.. ..	.. ..	28	25½	30½	3·2	22·9	81·4	
.. ..	Henry Sandow ..	15	25½	30½	3·2	22·9	68·4	
.. ..	E. J. Williams ..	25	24	29	5·5	39·3	93·3	5

In the class for the four best Dairy Cows, the following was the record :—

Owner's Name.	Breed.	Points for Appearance.	Weight of one meal's milk.	Points for milk.	Butter-fat.	Points for Butter-fat.	Total Points.	Awards
		Max. 30	lbs.	Max. 40	per cent.	Max. 50	Max. 120	
John Saundry ..	{ Guernsey Guernsey—crossed Guernsey and Jersey Guernsey—crossed }	18	53½	20½	5·5	39·3	77·8	
Mrs. Ben. Pearce	{ Guernsey and Jersey Guernsey and Short-horn Guernsey and Jersey Guernsey and Short-horn }	25	48½	18	4·8	31·4	74·4	
John Rowe ..	{ Crossbred " " " }	25	88½	33½	3·5	25·0	83·5	V.H.C.
T. Robins Bolitho	{ Guernsey " Jersey Crossbred }	28	65½	25	4·5	32·1	85·1	2
W. J. Hosken ..	{ Crossbred " " " }	28	105	40	4·2	20·0	98·0	1

WINTER FEEDING.

With regard to the winter feeding of dairy cows, as practised in Cornwall, perhaps the only point of special note is the large proportion of cereal foods given. For example, maize-meal is very largely given to milch cows, as is also crushed oats, barley-meal, and crushed wheat—alone, or more frequently, mixed with each other in various proportions. To many, the feeding of dairy cows with foods of such low albuminoid ratio may seem bad practice, but it must be remembered that animals out in the fields all day and frequently all night, and therefore having constant exercise, require a ration much richer in carbohydrates than animals which are kept indoors most of their time. Moreover, long-continued practice has proved these foods to be capable of producing a large yield of good milk, and butter of first-rate quality. And, in the light of recent investigations into the source of milk-fat, it appears that the value of cereal foods for milk production is much greater, and the necessity

for the supply of costly cakes and meals, rich in albuminoids, much less than has hitherto been generally supposed.

DAIRY METHODS.

By far the most generally practised method of obtaining cream or butter-making is, of course, the old-fashioned scalding system. The centrifugal separator is, however, steadily gaining in favour, mainly as the result of the work of the migratory Butter School of the County Council; indeed, it is said on good authority that in Cornwall there are, in proportion to its area, a larger number of separators at work than in any other county in England.

It may here be mentioned that, even where the separator is used, the cream is generally scalded or heated to a high temperature (160° to 175°) immediately it is obtained. This is done, as is said, to improve the butter by imparting to it that peculiar "scald" flavour which is so much desired by the local markets. But this heating or scalding, whether it be practised in connection with the separator method, or with the manufacture of clotted cream, also affects, as the scientist is aware, the bacteriological changes in the cream in an important manner, the practice being, in fact, simply an application of the system of Pasteurisation, of which we hear so much at the present time.

THE SCALDING SYSTEM; CLOTTED CREAM.

A brief description of this system of obtaining cream may be interesting to those who have not had an opportunity of seeing it practised.

The milk is brought from the cow-shed and strained into special pans. These pans are smaller in circumference, but deeper than those used in the ordinary shallow-setting system, being from about 9 in. to 12 in. in depth. The pans, when filled, are allowed to stand in the dairy until the cream rises. Twenty-four hours generally elapse before the separation of the cream is complete, but in ordinary practice the milk is not allowed to stand so long. Except during the heat of summer, the morning's milk generally stands only until the evening, *i.e.* for eight or ten hours, but the evening's milk longer—generally from fourteen to sixteen hours. In the hot weather of summer the milk does not remain so long, otherwise there would be a danger of its coagulating during the subsequent heating. Even if it did not become sufficiently acid to thicken completely, the

acidity might nevertheless be sufficient to cause part of the casein to be precipitated by heating. This would result in the cream containing numerous white specks which would injuriously affect its keeping qualities.

Reverting to the process, the next step is the scalding. The pans are carried from the dairy (very cautiously in order that the cream layer may not be disturbed) and placed either on a slow fire or, as is preferable, in a "steamer" or "scalding," which is a metal vessel containing boiling water. A common form of scalding, suitable for small dairies, is shown in the accompanying illustration (Fig. 1). It is simply placed on the kitchen range to boil. Larger dairies generally contain a special scalding apparatus which is capable of dealing with

Fig. 1.



two or more pans at the same time, thus effecting a considerable saving in time and expense. Fig. 2 illustrates an apparatus for scalding four pans. Scalding occupies, as a rule, about twenty minutes. No particular temperature is adopted, the appearance of the cream being the sole guide to the dairy maid in determining when the scalding is complete. When this point is reached, an irregular ring, corresponding with the bottom of the pan, will have formed on the surface of the cream, the surface will have a crinkled appearance, and under the layer of cream numerous small bubbles will have begun to form. The pans are then lifted off the scalding and carefully carried back to the dairy, where they are allowed to stand for several hours until the cream has cooled and become firm. The

ream is then lifted off, and, if for sale as such,* placed in little ugs or glasses, or, if intended for butter-making, placed in the ipening vessel.

As previously stated, no definite temperature is adopted, and herefore no thermometer is used by the Cornish dairymaid in he making of clotted cream. As the result of numerous bservations, the writer has found the temperature to vary so widely as from 160° to 200° Fahr. It is very probable that the emperature which it is best to adopt is largely dependent upon he proportion of cream in the milk, and also upon the density, or thickness, of the cream itself before scalding. In several

Fig. 2.



lairies noted for the excellence of their cream, I have found the emperature to be a high one, generally about 195°. As a general rule, given the same milk, the higher the temperature, up to 200°, the richer will be the cream, and, as will be bserved from the following analyses, this is mainly owing to he fact that the higher temperature drives out more water and eaves a thicker product.

Cream obtained by scalding at low temperatures is thus much thinner in consistency than that obtained when higher temperatures are adopted.

* In this district (Truro) clotted cream fetches, in summer, an average price of 1s. per pound, and in winter an average of 1s. 6d.

ANALYSES OF CREAM SCALDED AT TWO DIFFERENT TEMPERATURES.

		Cream scalded at 160° F.	Cream from same pan scalded at 195° F.
Water	.. .. .	35·15	26·11
Fat	.. .. .	57·86	66·54
Casein	.. .. .	4·65	4·89
Sugar, &c.	.. .. .	1·88	1·98
Ash	.. .. .	0·46	0·48
		100·00	100·00

An important point of difference in the composition of clotted and other creams is the proportion of casein present. While cream obtained by means of the separator or shallow pans seldom contains a larger proportion of casein than 3·6 per cent., clotted cream but rarely contains less than 4 per cent., and not unfrequently close upon 5 per cent. Notwithstanding the fact that clotted cream has, in the process of making, been subjected to pasteurisation (scalding), the high percentage of casein which it contains is very detrimental to its keeping qualities, though the pasteurisation must considerably prolong the time during which it remains sweet.

A series of experiments made recently by the writer go to show that the proportion of casein present in clotted cream depends mainly upon (1), the degree of acidity of the cream before scalding commences, and (2), the temperature at which the scalding is performed. The following table shows the results obtained by scalding two lots of cream (both obtained from the same milk) of different degrees of acidity at various temperatures:—

Acidity of Cream immediately before scalding.	Casein in Cream before scalding commenced.	Casein in Cream scalded at 160°.	Casein in Cream scalded at 170°.	Casein in Cream scalded at 180°.	Casein in Cream scalded at 190°.	Casein in Cream when scalding complete (195°).
per cent. ·215	per cent. 3·15	per cent. 3·74	per cent. 3·77	per cent. 3·77	per cent. 3·79	per cent. 3·80
·230	3·60	4·00	4·16	4·18	4·20	4·20

WATER FROM CLOTTED CREAM.

During the summer months the cream, after being scalded, is allowed to stand until next morning, when it is converted into

butter. In winter, when milk is scarce, butter-making takes place only once or twice a week. To convert the thick clotted cream into butter, the majority of Cornish dairymaids still practise the old-fashioned "tub-and-hand" method. The cream—itsself almost of the consistency of butter—is placed in a shallow tub and turned slowly round (generally with the hand) until the butter makes its appearance, which takes only a very short time. Some dairymaids churn only until the butter comes in the form of small granules; others until the granules have collected and formed one large lump. The buttermilk is then poured off, the butter washed, dry salted, and made up for market, generally in the form of flat bricks.

In many dairies the scald-cream is made into butter with an ordinary churn and worked in the modern way. When thus made, butter of better quality is obtained, as the removal of the buttermilk and surplus water is more complete, the butter preserves a better grain, and the somewhat objectionable use of the hand is obviated.

In the opinion of the writer, not much can be said in disfavour of this time-honoured tub-and-hand system of butter-making. Facts cannot be ignored, and certain it is that quite as large, if not a larger, proportion of really good butter can be found on the hotel and other tables of Cornwall as in any other part of the country, and such Cornish butter is mostly made upon the tub-and-hand system. In judging at many local Shows in the county, the writer has, oftener than not, unwittingly placed tub-and-hand butter before that made on the new system, even in the classes for long-keeping butter.

While butter made on the one system may be just as good as that made on the other, still, when the actual yield and the cost of production of butter made by the respective systems come to be compared, the modern separator and churn system shows itself to be by far the most economical. And so, for some time past, the aim of the Technical Instruction Committee of our County Council has been to instruct the rising generation of dairymaids in this new system.

DAIRYING INSTRUCTION IN THE COUNTY.

The Sub-Committee appointed by the Technical Instruction Executive Committee for Agriculture to carry out dairy teaching in Cornwall was naturally met at the outset by strongly-expressed conflicting opinions as to the relative merits of the several systems of butter-making in use in the county. A large number of dairy farmers tenaciously held to the old Cornish system of milk-scalding, affirming that as regards

quantity and quality of butter no modern method was equal to it. The Jersey creamer had strong advocates in East Cornwall and it was said that it was adopted with great success in a considerable number of dairies; while in the West the separator was reported to be the favourite. Under these circumstances the Sub-Committee thought it wise not to commit itself to any one system of dairy teaching without first testing the merits of the systems referred to. With this in view, it was arranged to conduct a series of experiments, which took place at Truro and Port Eliot in the winter of 1891.

The following is a summary of the results obtained:—From 40 gallons of milk, the butter obtained by the Separator amounted to 19 lbs. 14½ ozs.; by the Jersey creamer to 16 lbs. 8½ ozs., and by the Scalding system to 16 lbs. 2½ ozs., thus showing a gain of about 19 per cent. in favour of the separator as against the scalding method.

After being kept ten days, the butters made by the respective methods were reported on by Mr. Jackson, of Birmingham as follows: “No. 1” (separator)—“Has kept well and is still of good quality.” “No. 2” (Jersey creamer)—“Has gone strong.” “No. 3” (Cornish system)—“Inferior quality, but not deteriorated much by keeping.”

The following Statement of Analyses, by Mr. J. J. Berrie of Camborne, shows the composition of the butters made or prepared by the respective systems:—

	Jersey Creamer.	Separator.	Scalded.
Water	13·30	10·8	15·6
Fat	86·00	88·8	80·8
Curd	0·70	0·3	1·3
Salt	0·06	0·14	2·3
	100·06	100·04	100·0

On the results of the experiments being announced, the Agricultural Committee made arrangements for the conduct of a Travelling Dairy School, and the first commenced work at Port Eliot on February 1st, 1892, Mr. H. A. Howman (engaged as Lecturer on Agriculture to the Council) and Mr. Warren being the instructors. Since its establishment, the School has visited nearly all the dairy districts of the county and approximately 250 students have received instruction and gained certificates of proficiency.

THE FACTORY SYSTEM IN THE COUNTY.

In consequence of a general complaint of the want of uniformity in the butter sent up from the county to the large markets of the kingdom, a movement was initiated at the beginning of the present decade to establish a factory in the Penzance district (which is the principal dairying centre of the county), to which the farmers of the district could send their milk to be manufactured into butter of one uniform quality. The factory was established at Catchall, and, having met with a fair measure of success, the enterprise rapidly became a popular one. This factory is still prospering, and, at the present time, deals with the milk of 500 cows.

Since the establishment of the Catchall Dairy, several other companies have been formed, amongst which may be mentioned the Cornwall Dairy and Farm Produce Company, Limited, the Land's End Dairy Company, and the Wendron Dairy Company, all of which appear to be in a fairly prosperous condition. The Cornwall Dairy and Farm Produce Company, Limited, has a subscribed capital of between 10,000*l.* and 12,000*l.* The principal factories belonging to this company are situated at Bosliven, near Penzance, and Gweleath, near Helston; each of these has several branch creameries. The produce is sent to London principally, but a large trade is also being developed in the West of England. The trade includes butter, separated cream, Cornish cream, cream cheese, poultry, and eggs. Farmers are paid for the milk according to the percentage of butter-fat it contains, and the market price of the butter.

The factory system is gradually gaining in popularity, and a rapid extension of the system is likely to take place in the near future.

CHEESE-MAKING.

In conclusion, it may be mentioned that there is now some probability of the cheese-making industry being developed in the county. In days gone by, cheese-making was practised, but only to a very limited extent, and in the most primitive of fashions. Owing to the industry having eventually died out, the notion has become prevalent amongst the farmers of Cornwall that their land, their pastures, and their milk are not adapted for the making of cheese. In order to determine whether any ground existed for such an opinion, the County Council last summer appointed a Sub-Committee to investigate the matter. Demonstrations in Cheddar Cheese-Making were conducted at two dairying centres, and nearly forty cheeses were made. The result was eminently satisfactory. Not only was it possible to

produce cheese, but, in the opinion of experts who examined the cheeses when ripe, the quality of the product compared very favourably with that obtained in the home of the Cheddar industry. The yield of cheese also was exceptionally high, being, on an average, 1·06 lb. per gallon of milk.

One great drawback, however, to the development of this industry in the county is the smallness of the dairy herds, and another is the want of proper dairy buildings for the manufacture and ripening of the article. Under these circumstances, the probability is that the factories will take the matter up, and in that case there is every likelihood of the associated butter and cheese industry becoming a successful one.

VII.—*The Plant Foes of the Farmer.*

By WILLIAM CARRUTHERS, F.R.S., F.L.S., &c.

EVERY farmer has the credit of being an inveterate grumbler. It is said that he is never satisfied with his crops or with the weather. But if there is some truth in the charge that he is unduly pessimistic, he has much justification for his grumble, for the success of his various operations is governed by conditions which are mostly beyond his control. Sun and rain, heat and cold, have to be accepted as they come. A dry season burns up his pastures, and prevents the action of his artificial manures; a wet season encourages parasitic fungi, which reduce the quality and quantity of his cereal crops, and destroy his potatoes and other root crops. He can fight against the weeds in his arable land, and reduce them in his pastures, but as yet he has been able to do very little indeed to prevent the scattering of those minute spores which, in their season, fill the air and when the proper conditions are present, are ever ready to attack the special plant or animal that is their host. Moreover, he is no longer able, as he once was, to meet the cost of labour and material required to make a fair fight with his enemies. Cheap ocean carriage brings to him competitors from every quarter of the globe—from regions where land is cheap, and taxes and wages are low. By thorough tillage and high farming he endeavours to bring his long cultivated fields to rival the unexhausted virgin soils of America in the production of wheat. His pasture lands, singularly favoured by a mild and moist climate, due to our insular position, and to the warm waters of the Gulf Stream washing our western shores, are as fertile as ever; but the cold chamber of the ocean steamer delivers beef and mutton from the

ral pastures of Canada, South America, Australia, and New land, at prices which make profitable competition extremely cult. The market value of his produce is accordingly kept n to the benefit, no doubt, of the consumer, but to the er's serious loss. With reduced returns he has to cultivate lands with greater care, supplying them with costly manures ; as to face bad seasons with poor harvests, and to combat ngible and, to him, invisible organisms which kill his animals estroy his crops. Is it, then, a matter to be wondered at he is not infrequently heard to grumble? He has too n cause for his grumble.

here are, however, some evils that the farmer has to face ch are now better known than they were in days gone by. hin the present century maladies affecting both plants and aals were ascribed to plague, miasma, cold mists, electricity ts absence, and such general causes. The botanist, the ogist, and the chemist have been doing good service in rmining the nature of these obscure maladies and have gested remedies which in many cases have enabled the er to prevent or remedy the attacks. I propose to deal t some of the evils that fall within the province of the nist, and to show in what way he has been able to assist farmer in his efforts to cope with the difficulties he unters.

he most obvious plant enemies of the farmer are the weeds, ch occupy the place of, and consume the food which belongs useful plant. The weed in manufacturing its own food oves from the soil a certain amount of water with the tances dissolved in it, and to this extent reduces the lies that should be utilised by the crop. Nowhere has the y due to weeds been more apparent than in the well-known riments which have been carried on for more than half a y at Rothamsted by Sir J. B. Lawes and Sir J. H. Gilbert. of the plots there has been devoted to the continuous th of wheat, and no manure of any kind has been applied . By careful preparation of the soil, and by the complete oval of weeds, this thoroughly exhausted plot has for years led a crop of wheat which is heavier than the average t crop of America. This fact should impress upon the l of the farmer the necessity of making every possible t to get rid of useless weeds. On arable land this is aratively easy ; the weeds can be seen, and the hoe can, rule, be easily applied ; but with pastures it is very different, ome of the apparent weeds are useful to the stock, and some e grasses are most useless weeds. Without the radical of ploughing up a pasture full of weeds, cleaning it and

then laying it down with pure and suitable seeds—and this, though no doubt expensive, would in many cases be profitable—it is not easy to get rid of weeds. The first difficulty is to determine what plants should be treated as weeds. Animals have their likes and dislikes in regard to their food, and plants that stock refuse to eat should have no place in a pasture. Among such plants two grasses are especially prominent—Bent-grass, or Twitch (*Agrostis vulgaris*), and Yorkshire Fog (*Holcus lanatus*). No doubt, if there be no other food, stock, rather than starve, will eat them, and they will derive nourishment therefrom. But, where there are other grasses to be had, they are rejected by all stock, and consequently they freely flower and produce seed, and so obtain an ever-increasing share of the soil.

Some plants occasionally met with in fields are poisonous, and cause year after year the death of horses, cattle, or sheep. Meadow Saffron (*Colchicum autumnale*), Dog's Mercury (*Mercurialis perennis*), and Water Dropwort (*Enanthe crocata*), are examples of such plants. Animals brought up on lands where any of these plants occur as a rule avoid them, but frequently strange stock eat them, and are killed. When poisonous plants are supplied in the house, the animals have no freedom of selection. Several valuable horses were killed in this way a few months ago, through being supplied with some green food which, cut from under the hedges, contained a considerable quantity of Dog's Mercury. No poisonous plant ought under any circumstances to be allowed to remain in a pasture. Even the hedges, shrubberies, or plantations, to which stock have access, should be carefully looked over for the discovery of such plants. The foliage of the yew is a well known cause of death, and this is often accessible to animals owing to the prunings being carelessly left on the field where they have fallen. Dangerous plants, like laurels, in shrubberies, or like the sweet-scented tobacco in gardens, have, in my recent experience, caused death to stock.

Some plants that have the appearance of weeds, and are usually treated as such, are, however, valuable ingredients in pasture. Yarrow (*Achillea Millefolium*), for instance, is much liked by stock, while most of its near allies are uniformly rejected.

Other plant enemies of the farmer are those termed parasites, which decline to manufacture their own food in the way that plants generally do, but take part or the whole of their food from other plants. The parasite of ancient Greece was a man who obtruded himself uninvited into the houses of the rich that he might get a free meal, and the action of the plant-parasite

responds to this. Plants should send down their roots into the earth to collect the water with the minerals dissolved in it, and spread their leaves in the air to obtain the carbon that they separate from the small amount of carbonic acid present in the air. From these inorganic substances the plant manufactures, with the help of the protoplasm and the chlorophyll (the green coloured matter in the leaves) in its cells, the whole of its food. Some plants, however, prefer to divert the food prepared by others to their own use. All plants that are destitute of chlorophyll must be dependent on other plants for their nourishment. Even parasitic plants that possess chlorophyll do not derive the whole of their food supply from the plants which they are living.

Many plants, like Eyebright and Yellow Rattle, ought to be able to manufacture all the food that they need, for they have true roots and green leaves. In their early life they do so, but afterwards their spreading roots travel about in the soil in search of the roots of other plants, with which they form a one-sided friendship. Attaching themselves by the suckers to these roots, they send out processes which penetrate the roots, and withdraw from them a supply of food, while at the same time their other roots are collecting water from the soil in the ordinary manner. The Euphrasy, which brightens our upland pastures with its white flowers, and forms some places a considerable proportion of the vegetation, draws sap from the roots of grasses. This cannot be done without harm to the pasture. The popular name for this plant in Germany is *Milchdieb*, that is milk-thief, and this designation is due to the belief that when this plant is in full flower the cows yield less milk. Its neighbours, Yellow Rattle, Cuscuta, Cow Wheat, and Bartsia, are, like the Euphrasy, root-parasites on the roots of different plants.

In the mistletoe we find a further advance towards complete parasitism. This familiar plant lives on apple and other trees, chiefly on the oak. Its berries are the favourite food of the thrush, and the seed dropped on the branch of a suitable tree sends out a root which, on reaching the bark, flattens itself into a sucker, and so secures a firm hold on the branch. From the centre of the disc a process is pushed out which bores its way through the bark, until it is arrested by the wood, into which it cannot pass. Year after year the tree adds a new layer of wood to the circumference of its stem and branches, and consequently with this a layer of wood increases the stem of the mistletoe. If, after some years, a section is made through the stem of the mistletoe and the branch on which it has grown, it will appear as if the parasite had pushed its way into the wood.

This appearance is, however, really due to the concurrent growth of the parasite and the host plant, as has been described. The cells of the mistletoe are closely united to the cells of the plant, and the sap, which is chiefly water passing up from the roots, is diverted into the parasite. The mistletoe has chlorophyll in its leaves, so that, with the water it steals from the apple branch, it is able, by the help of its green leaves, to manufacture its own food. It does not appear to take possession of any of the elaborated sap from the apple-tree. This, no doubt, accounts for the indifference we find among growers to the presence of the mistletoe in the orchard.

There are parasites which obtain the whole of their food from the host plant, because, being destitute of chlorophyll, they are unable to manufacture food for themselves. Fair examples of such plants are Dodder and Broom-rape, both of which are sometimes most destructive to Red Clover.

Several species of Dodder, which are natives of Britain, such as on nettles, hops, thyme, furze, and heather, as well as clover. One species that has been introduced with seed from abroad often does serious damage to cultivated flax.

Dodder is closely related to the Bindweed, or Convolvulus. The seeds when ripe fall out of the capsule, which is transverse near the base. As the clover Dodder produces many clusters of flowers, a large number of seeds fall to the ground. They remain dormant through the winter, but germinate somewhat late in the season, at a time when the plants on which they have to depend for their food have made some progress. The seeds germinate on damp earth or decaying foliage. They push their roots into the ground, and raise slender leafless stems into the air. These twist about in search of a clover plant; they will have nothing to do with other plants. If the searching stem fails to lay hold on clover, it falls down on the ground, but remains alive for several weeks. Should a young clover plant come near to it, the prostrate stem recovers, twists itself round the clover and, securing a supply of food, starts on a vigorous life. The root in the earth is no longer of any use, decays, and the Dodder has no further connection with the soil. The Dodder is without chlorophyll, and so being unable to manufacture its own food is wholly dependent on the clover. It branches repeatedly, and each branch attaches itself to the clover by suckers, which, penetrating the stem and withdrawing the food, causes the clover to perish from starvation. Before this happens, the Dodder has attached itself to neighbouring clover plants, on which it feeds, causing serious injury to the crop. But the evil does not stop here, for the Dodder leaves innumerable seeds which, remain

it in the soil for several years, will ruin a succeeding crop on its appearance in due rotation.

Broom-rape, like the Dodder, has no chlorophyll, and entirely depends on its host for all its food. We have at least nine native species of Broom-rape, one of which, as I suggest, attaches itself to the broom, the others being on various herbaceous plants. They have more or less stems, brown scale-like leaves, a spike of purple, yellow, flowers, and many minute seeds.

Broom-rape is a root parasite, and has to find its host ground. The seed germinates on the surface, and then grows through the soil in search of its host. The Clover-rape, fed by the roots of other plants, either attaches itself to a clover, or, having exhausted itself in the pursuit, dies. It finds the root it is in search of, it lays hold of it by bringing its root end, and forms a roundish warty process on the root. One of these warts pushes its way into the root and secures sufficient food at the expense of the host to enable the parasite to raise its flowering stalk into the air and to develop its seeds.

The seeds of the Dodder and Broom-rape are sometimes mixed with the farm seeds into fields where they have not been known. *Cuscuta Trifolii* is the only Dodder and *the minor* the only Broom-rape that lives on clover. The Daddies or Broom-rapes, in searching for their own host, pass by the stem or roots of clover.

The most dangerous parasites to the farmer do not belong to the great division of flowering plants. A very large group of plants, called Fungi, are entirely destitute of chlorophyll, and are wholly dependent for their growth and seed-bearing on a food which has been already organised. This they obtain from dead vegetable or animal matter, or from living plants and animals. They do not tap the living organism, but their roots or mycelium penetrate the substance of the host and appropriate whatever is required for their food. They are not satisfied with the crude sap, or even with that which has been elaborated, but they consume the protoplasmic cells, as well as the wood and harder tissues. Having devoured the whole plant with mycelium, they convert it into a disorganised and often putrid mass.

By some examples of these destructive fungi can be readily seen. The leaves and fruit of Barberry often show signs of minute yellowish cups. These contain innumerable (or seeds), which when ripe are carried away in the air. They will not grow again on the Barberry, but if they fall on wheat, and obtain sufficient external moisture to enable

them to germinate, they push their mycelium into the straw or leaf, and presently burst through the skin in small longish spots of red spores which we call red rust. The spores of the red rust grow on and attack the wheat in the same way as the spores from the Barberry do, and towards the autumn they bear another kind of spore, consisting of two cells, which, when it is found on the straw, is called mildew. These spores are able to remain dormant during the winter, for they are protected by a harder and thicker cell wall than are those of the rust. Mildewed straw adds myriads of these spores to farmyard manure. After their winter's rest they germinate and produce other minute spores, which find their suitable host plant on the Barberry, from which the spores are again scattered on the wheat. This parasitic fungus has been known wherever wheat has been cultivated, but its strange story, representing a cycle of four distinct forms of life, each producing very different spores, has been worked out only within the present half century.

The potato fungus is another most destructive parasite. It was first known in Europe about fifty years ago. Where it came from has not been discovered. It was first observed in Belgium, and not many weeks after its spores had spread over Great Britain and Ireland, and to a large extent destroyed the crop. It brought famine, disease, and death to Ireland, and every year since it has re-appeared with greater or less virulence. It attacks the plant through the leaves, and spreads through the whole plant, producing masses of spores in its progress, and ultimately leaving the plant a putrid mass. Spraying with a solution of sulphate of copper has been found an efficient destroyer of the growing spores, and has prevented, to a very large extent, the injury to the tubers.

Only last year a serious disease attacked the mangold crops in some parts of the south of England. This year I have succeeded in obtaining the fungus in fruit, and have ascertained that it is *Phoma Betae*, which for a number of years has attacked the sugar beet in Denmark and Northern Germany. Like the fungus of the potato, it first obtains access to the plant through the leaves, then passing down the leaf stalk it gets into the root, which it speedily converts into a dark, useless, and repulsive mass. The spores are produced in immense numbers, in little hemispherical fruits. It is to be feared that this new malady will remain with us and be a great destroyer of this valuable feeding root.

When one realises that there are already nearly 50,000 different kinds of fungi named and described, and that the larger number of them are parasites on plants, it is obvious that the farmer has a huge host of invisible enemies to meet. Happily,

h kind usually keeps to one species of plant, so that there is fear of the fungus of the potato or the mangold attacking wheat. Nevertheless, the spores are produced every year in quantities sufficiently large to make the most promising crops worthless if the physical conditions for their germination allow themselves. Help, however, from the scientific laboratory is ever increasingly accessible to the farmer.

A remarkable group of plants are the Bacteria, the smallest of our own plants. They are destitute of chlorophyll, and have, consequently, like the fungi, to obtain their food from already organised materials. These minute plants are very simple in structure. They increase by division, and this proceeds so rapidly that they multiply enormously. When the substance in which they are living is exhausted they produce spores, which remain dormant, it may be for a long time, until conditions favourable to life appear, and then a new generation of bacteria begins. They are able to move about by means of minute bristly hairs, called cilia. In form they are round (Cocci), oval (Bacteria), rod-like (Bacilla), spiral (Spirilla, &c.), or filamentous (Leptothrix, &c.).

The saprophytic species, being those that live on dead matter, are found on decaying animal and vegetable substances. When they give off a foetid odour their work is called putrefaction. Fermentation is also a result of their action. One kind causes the souring of milk, others show themselves in the making of cheese, giving a special flavour to it. Enormous numbers of them live in the soil and possess the power of converting ammonia into nitric acid, a form which enables the invaluable nitrogen to be taken up by plants.

Bacteria live also in the bodies of animals. Some are innocent, or even helpful, like those found in the alimentary canal; others are the causes of the most dangerous diseases to which men and animals are subject, such as cholera, diphtheria, tuberculosis, anthrax, and quaternary evil.

Others, again, live in growing plants. The most valuable to the farmer are those which are found in the roots of various plants belonging chiefly to the Leguminosæ. Their action is not destructive, host and parasite being mutually helpful. They enter the tissues of the root, say of clover, and form small cells or nodules. They have the power of laying hold of the free nitrogen which they find in the soil, and oxidising it so as to make it available for the use of the clover. Experiments have proved that the presence of these bacteria is necessary to the vigorous life of the clover. Every organism in soil can be killed by subjecting the soil to a high temperature. Soil thus sterilized has been used for exhibiting the influence of bacteria.

Seeds planted in it and supplied with distilled water germinate, but make a weakly growth and speedily die, while no tubercles are found on the roots of these plants. When some of the same sterilized soil has powdered tubercles mixed with it, the clover seeds planted in it, being treated in the same way as the others, will produce vigorous clover plants. As much more soluble nitrogen is manufactured in these nodules than is used up by the clover, it remains with the roots in the soil and becomes available for the succeeding crop. From experiments at the Royal Agricultural Society's farm at Woburn it is found that the gain to the following crop from the work of the Bacteria in these nodules is equal to a good dressing of farmyard manure.

It should afford a little grain of comfort to the farmer to know that methods for preventing or remedying some of his chief troubles have been discovered, and that with an increasing acquaintance with the causes of them additional help may be confidently expected; further, that among the nearest relatives of his most dangerous enemies he has a host of invisible friends who have all through the centuries been working for him in his most fertile soils.

VIII.—*The Society's Dairy and Farriery Schools.* By THOS. F. PLOWMAN, Secretary and Editor.

CHEESE SCHOOL.

A CHEESE School has been carried on by the Society during the past year, on behalf, and at the cost, of the Somerset County Council, at Fenswood Farm, Long Ashton, the owner of the farm being Sir J. H. Greville Smyth, Bart., and the occupier Mr. R. Harding.

The School was held at the same farm in 1897, and was continued there during 1898, with the object, especially, of further investigating the cause of the defects found in the cheese in 1897.

The usual arrangements were made with the tenant for the use and control of his dairy, the supply of milk from his cows, and the boarding and lodging of pupils in his house.

The School was supervised by Mr. G. Gibbons, the teacher being Miss E. J. Cannon. The School had also the advantage of the advice and experience of Mr. H. Cannon, of Milton Clevedon.

The following table shows the number of Students at the Society's Cheese Schools from their initiation until the present time :—

County.	Centre.	No. of days School was open.	Year.	No. of Students.							
				5 weeks.	4 weeks.	3 weeks.	2 weeks.	10 days.	1 week.	Shorter Periods.	Total.
Werset ..	Wells	184	1890	..	5	1	6	..	51	28	91
" ..	Frome	229	1891	..	12	1	12	..	32	9	66
" ..	Axbridge ..	214	1892	..	14	..	5	2	16	2	39
" ..	Butleigh ..	214	1893	..	24	..	3	..	15	2	44
" ..	Murk	214	1894	..	16	..	4	..	22	1	43
" ..	Haselbury ..	214	1895	..	30	..	..	..	8	4	42
" ..	Cossington ..	214	1896	1	10	..	3	..	8	..	22
Wet ..	{ Milton (near Gillingham)}	209	1896	..	22	1	3	..	6	..	32
Werset ..	Long Ashton	214	1897	..	16	..	5	..	4	..	25
" ..	"	214	1898	..	19	1	1	..	14	2	37
		1,911	..	1	168	4	42	2	176	48	441

The following shows the quantity of cheese made in 1898, and the prices realised; Messrs. Hill Bros., of Evercreech, being the buyers:—

Place.	Number of Draft.	Weight.	Total Weight.	Price per 112 lbs.	Milk used.	Average price per 112 lbs. of the year's output.
		cwt. qrs. lbs.	cwt. qrs. lbs.	£. d.	galls.	£. d.
Long Ashton }	First (April 1 to 30) ..	18 2 22	163 1 9	50 0	20,000	57 6
"	Second (May 1 to 31) ..	28 0 6		58 0		
"	Third (June 1 to July 31)	{ 34 0 5, 15 2 11		{ 60 0 50 0		
"	Fourth (Aug. 1 to Oct. 31)	66 3 21		60 0		

An Experiment Station was, as usual, attached to the School, the cost, with the assistance of a Government grant, being defrayed by the Society. Detailed accounts of the work carried on there during the past year will be found further on in this volume.

Since the establishment of the Butter and Cheese Schools in 1888 and up to the end of 1898, the Society has, in conjunction with County Councils and other public bodies for whom it has acted, expended the sum of 24,003*l.* in the promotion of technical instruction in dairying through the medium of these Schools. Even this sum by no means repre-

sents the total expenditure, for it does not include the cost of hiring and fitting up buildings for the travelling Butter Schools, and other liabilities undertaken by local bodies—such as the County and District Committees—co-operating with the Society. During the period named, 169 centres in sixteen different counties have been visited by the Society's migratory Butter Schools, and 3,084 pupils have received instruction therein. Stationary Cheese Schools have been located for seven months each at ten centres, viz. nine in Somerset and one in Dorset, and have been attended by 441 pupils.

At the Society's Annual Exhibition, which opens on May 24 next at Exeter, special Prizes (particulars of which will be found on pages lxxxiv.–cxii. of the Appendix to this volume) will be given for Cheese made by pupils who have attended any of the Society's Schools.

The Somerset Cheese School for this year will be opened early in April at Pylle, near Shepton Mallet, at Hedge Farm, in the occupation of Mr. T. H. Dowling, as tenant under Lord Portman.

FARRIERY SCHOOL.

The Travelling Farriery School, carried on by the Society for the Somerset County Council, has been well attended by pupils during the past year.

The School has not only been a success in point of attendance, but the pupils have shown a genuine and intelligent interest in their work, and have not hesitated to express themselves as thoroughly satisfied with the instruction given.

The School is supervised by the Society's Farriery Steward (Colonel Best), and the Veterinary Surgeon attached to it is Mr. G. H. Elder, M.R.C.V.S., of Taunton. The latter lectures to the classes upon the anatomy of the horse's foot, and upon other subjects connected with farriery, and acts as general adviser upon the work of the School. These lectures have been open to all interested in farriery, and have been well attended. At the lecture given at Langport most of the smiths and their men for miles round were present. Mr. C. T. Knight, C.C., presided, and between sixty and seventy persons, many of whom came considerable distances, attended.

The instructor is Mr. W. B. Blackall, master smith, late of Colleshill, Highworth, Wilts, who, previous to his appointment to the post, had won twenty-one prizes and several high commendations at shoeing competitions held by the Bath and West and Southern Counties Society and other Societies.

The instruction is restricted to those who are already in the

Locality.	Year.	School		No. of Pupils.	Total No. of Pupils each year.
		Opened.	Closed.		
.. .. .	1895	April 8	Aug. 5	32	71
.. .. .	"	Aug. 7	" 31	7	
.. .. .	"	Sept. 2	Sept. 14	3	
be	"	" 16	Oct. 25	12	
.. .. .	"	Oct. 28	Dec. 6	12	
.. .. .	"	Dec. 9	" 20	5	
.. .. .	1896	Jan. 6	Jan. 17	5	
.. .. .	"	" 21	March 14	13	
vey	"	March 16	April 10	8	
.. .. .	"	April 13	" 24	5	
.. .. .	"	" 27	June 2	7	92
.. .. .	"	June 3	" 16	2	
.. .. .	"	" 17	" 30	4	
.. .. .	"	July 1	July 14	4	
.. .. .	"	" 15	Aug. 29	10	
.. .. .	"	Aug. 31	Sept. 26	7	
.. .. .	"	Sept. 28	Oct. 9	5	
.. .. .	"	Oct. 12	Nov. 14	10	
.. .. .	"	Nov. 16	" 28	4	
.. .. .	"	" 30	Dec. 23	8	
.. .. .	1897	Jan. 11	Jan. 23	2	69
allet	"	" 25	Feb. 6	2	
.. .. .	"	Feb. 8	" 20	4	
.. .. .	"	" 22	March 13	6	
.. .. .	"	March 15	" 29	1	
.. .. .	"	" 29	May 10	10	
.. .. .	"	May 18	July 3	8	
.. .. .	"	July 5	" 17	3	
.. .. .	"	" 19	" 31	5	
.. .. .	"	Aug. 3	Aug. 21	4	
per-Mare	"	" 23	Oct. 2	9	71
.. .. .	"	Oct. 4	" 16	3	
.. .. .	"	" 18	Nov. 12	6	
.. .. .	"	Nov. 15	Dec. 8	6	
ton	1898	Dec. 13	Jan. 15	6	
r	"	Jan. 17	Feb. 5	3	
.. .. .	"	Feb. 7	March 5	6	
na	"	Mar. 7	Apr. 2	6	
oud	"	Apr. 4	" 20	2	
.. .. .	"	" 26	May 6	3	
.. .. .	"	May 16	June 3	3	
.. .. .	"	June 4	July 8	4	
.. .. .	"	July 11	" 23	4	
r	"	" 25	Sept. 3	10	71
ry	"	Sept. 5	" 17	2	
.. .. .	"	" 19	" 30	4	
.. .. .	"	Oct. 6	Nov. 19	10	
lett	"	Nov. 21	Dec. 17	8	
		Total	303

trade. This is essential, not only to avoid jealousy and ill-will, but because the instruction can only be given effectively, in the necessarily limited number of lessons, to those who have already acquired a fair knowledge of ordinary shoeing. The aim is to improve old hands rather than to teach beginners.

A course of instruction, the fee for which is 2s. 6d., consists of ten lessons. These are given at six o'clock in the evening, as the pupils, having their ordinary work in the daytime, cannot conveniently attend before that hour. A class consists of four pupils, and, as the same pupils cannot always attend night after night, it is generally arranged to have two different classes, which are taken on alternate nights. The pupils are shown the correct method of shoeing every kind of horse they are likely to have to deal with, and how to adapt shoes to abnormal conditions of feet. A typical collection of shoes and hoofs is always on exhibition at the School, and the explanations given of them are much appreciated.

The accompanying table (p. 139) shows the places visited and the number of pupils at each since the starting of the School.

Forges, iron, and all the necessary tools and appliances are provided by the Society, and are contained in a van, which is moved about from place to place, so that the School may be brought within easy reach of the smiths of any particular locality in the county.

At the conclusion of a certain number of courses in a district, a competition for prizes and certificates is held, open exclusively to pupils from the classes, and, in order to encourage regularity of attendance, only those who have attended at least eight times are entitled to compete.

The Registration Committee of the Farriers' Company admit winners of First Prizes in these competitions to the Official Register *free of charge*, on their satisfying the judges that they have a fair knowledge of the structure of the horse's foot, while other competitors who satisfy the judges of their competency are admitted on payment of the usual fees (viz., 1l. for masters, and 5s. for doormen).

During the past year competitions were held at the places named, when the following pupils were successful:—

April 22, at Bath:—

NAG HORSE SHOEING.

1st prize.—Charles Holcombe, Weston, Bath.

2nd prize.—E. Bromfield, 5, Church Gates, Weston, Bath.

3rd prize.—R. W. Bandy, High Street, Frome.

Very Highly Commended.—Lewis Ball, Felton, Winford, Bristol.

Commended.—J. S. Garland, Widcombe, Bath; Ernest Goodfellow, Lock's Lane, Frome; G. Drewett, Batheaston, Bath; and R. Daniels, Combe Down, Bath.

CART HORSE SHOEING.

- 1st prize.—Charles Bowden, 51, Old Bread Street, Bristol.
2nd prize.—Wm. Poole, Lulsgate Bottom, Felton, Bristol.
3rd prize.—Henry Ball, Winford, Bristol.
Commended.—H. T. Abbott, Paulton, Bristol; Geo. Radford, West Town, Bristol; H. A. Williams, Church Road, St. George's, Bristol; F. Drewett, Batheaston, Bath.

September 30, at Bridgwater :—

NAG HORSE SHOEING.

- 1st prize.—William Welland, Berrow, Burnham.
2nd prize.—Josiah Andrews, North Curry, Taunton.
3rd prize.—Fred. J. Locke, West Street, Somerton.
Reserve.—John Davey, 4, Priory Street, Bridgwater.

CART HORSE SHOEING.

- 1st prize.—Herbert Bromfield, Water Lane, Somerton.
2nd prize.—Herbert J. Welland, Shearston, North Petherton.
3rd prize.—George Welland, Mark, near Highbridge.
Reserve.—Hubert Simeon Male, Kingsbury Episcopi, South Petherton.
Highly Commended.—Mark Bridle, Brent Knoll; J. W. Harris, Seymour Place, Cheddar.

December 22, at Langport :—

NAG HORSE SHOEING (for Smiths 25 years of age and over).

- 1st prize (1*l.*).—Jas. Churchill, Curry Mallet.
2nd prize (10*s.*).—Christopher Shire, Bow Street, Langport.
3rd prize (7*s.* 6*d.*).—Ebenezer Scriven, North Street, Langport.
4th prize (4*s.*).—Archibald Scriven, North Street, Langport.

CART HORSE SHOEING (for Smiths under 25 years of age).

- 1st prize (1*l.*).—John Rowsell, Drayton, Curry Rivell.
2nd prize (10*s.*).—Daniel Coate, North Street, Langport.
3rd prize (7*s.* 6*d.*).—Fred Crossman, Curry Mallet, Taunton.
4th prize (4*s.*).—Chris. Andrews, North Curry.
Commended.—William J. Stokes, The Hill, Langport, and Walter Slade, Aller, Langport.

A Special Prize of a Doorman's Hammer was offered in this class by Messrs. Kingsbury and Son, for the best competitor not being a prize-winner, and this was awarded to William J. Stokes.

Mr. F. Meade, C.C., also offered a first and second prize for the best Shoeing of a Donkey, which were awarded to Jas. Churchill and Archibald Scriven, respectively.

At the Shoeing Competitions, held in connection with the Annual Show of the Somerset Agricultural Association in May last, all the prizes and commendations, except one third prize, were won by pupils of the School.

IX.—Observations on Cheddar-Cheese Making. Report for 1898
By F. J. LLOYD, F.C.S.

CONTENTS.

	PAGE		PAGE
I.—INTRODUCTION AND OBJECTS OF EXPERIMENTS.		(c.) The Effect of the Abnormal Milk	160
(a.) The Farm	143	(d.) Moisture in Curd	161
(b.) An Experiment on Liming	144	(e.) The Loss of Fat in the Whey	162
(c.) Comparison of Results obtained, 1891–98	146	(f.) On the Ripening of Cheddar Cheese	163
(d.) The Stock and Yield of Milk	148	(g.) The Composition of the Cheeses	168
(e.) The Quality of the Milk	149		
(f.) The Cattle Yielding Abnormal Milk	152		
II.—THE RECORD OF OBSERVATIONS.		III.—THE BACTERIOLOGICAL OBSERVATIONS.	
(a.) Comparison with 1897 and preceding years	155	(a.) The Vinegar Taint	169
(b.) The Abnormal Acidity of the Milk	159	(b.) Spongy Curd	170
		(c.) Effect of Sewage	171
		(d.) The Faecal Taint	171
		(e.) Bacteria and Plants	172

I.—INTRODUCTION AND OBJECTS OF EXPERIMENTS.

As some of the cheeses made at the Cheese School at Fenswood Farm, Long Ashton, near Bristol, in 1897, were not of that uniform good quality characteristic of the cheese made in previous years, the Committee decided that it would be desirable to continue the School at the same site during 1898, so as, if possible, to discover and remedy the causes of trouble. The Board of Agriculture had given notice to the Society that the grant made for experimental purposes would cease at the end of 1897. But, in consideration of the peculiar circumstances which had necessitated the continuance of the School at Long Ashton, the Board decided to make a further grant. I was of opinion that the inferior cheeses were due partly to the peculiar taints in the milk, partly to the cheeses having been kept too long before they were sold, and to their having deteriorated by keeping. The reason why they had not been sold soon enough was that the cheeses at Fenswood Farm ripened far more rapidly than those made at previous Cheese Schools. This rapid ripening depended on the fact that the curd was exceptionally moist, a condition partly due to the peculiar composition of the milk.

In order to discover whether these views were correct and what were the peculiar conditions which existed at Long Ashton, the following questions were set before me as the objects of the 1898 Cheese Observations:—

1. Were the taints in the milk in 1897 due to the fact that for many years previously some of the land had been heavily stocked with sheep, or to the water supply, or to some other cause?

2. Will the milk have the same exceptional chemical composition as regards casein as last year?

3. If so, is the deficiency of casein due to individual cows, or peculiar to the whole herd?

4. If peculiar to the herd, is it due to the nature of the herbage?

5. Is the acidity of the milk again exceptionally low, and if so, what is the cause?

6. Can a better keeping cheese be produced by varying the method of manufacture?

In reporting upon the work done I shall endeavour, so far as possible, to follow the lines of former Reports.

(a.) THE FARM.

In order better to describe the work of 1898 it will be well, in the first place, to give a description of that portion of Fenswood Farm which is referred to in this Report. There were in all fifteen fields in which at one time or another the cows were kept, and the following table gives the number, name, and produce in 1897 and 1898 of each field, and also shows whether the land was limed or not.

Mr. Carruthers, the Society's Consulting Botanist, visited the farm, inspected the pastures, and reported as follows:—

REPORT ON VISIT TO FENSWOOD FARM, NEAR BRISTOL.

I visited Fenswood Farm on the 20th of June last. Under the guidance of Mr. Lloyd I examined all the fields on the farm in which the dairy cows had been feeding. The pasture was good and free from wild onions and other weeds which give their odour to milk and to the butter and cheese made from such milk. There was nothing in the herbage* to account for the difficulties in cheese-making in 1897.

WM. CARRUTHERS.

2nd August, 1898.

* Mr. Carruthers' statement has no reference to different bacteria which may frequent different grasses or plants as suggested at the end of this paper.—F. J. L.

FIELDS AT LONG ASHTON.

	Acres.	1897.	1898.
1. Wilmots and Bushey Ground	26	Pasture	Pasture, limed.
2. Home Field and Orchard ..	9	"	" "
3. Middle Rowens	7	After-grass ..	" { left
4. Fishers	4	"	" { unlimed.
5. Hop and Mead	21	"	" "
6. The Tips	5	Pasture	Pasture
7. Kings Craft	14	After-grass ..	"
8. Great Tining	9	Pasture	"
9. Little Tining	6	"	"
10. Goulstons Ground	8	"	"
11. Hivings Hill	10	"	"
12. Battens Sideland	11	"	"
13. Hill Top	12	After-grass ..	After-grass.
14. Costlands	8	"	"
15. The Mead	3	"	Pasture.

(b.) AN EXPERIMENT ON LIMING.

It is generally believed that land which has been stocked with sheep is injurious for cheese-making, and can be materially improved by liming.

The Home fields, Wilmots and Bushey Ground, having in the past been heavily stocked with sheep, were selected for an experiment on liming. The orchard also was limed, so that the cattle could be both kept and brought home to milk on land which had all been limed. The application of the lime was commenced about the middle of February, and was not finished until early in April, but it was not until some time after that there was sufficient rain to wash the lime into the soil. The quantity of lime used was two tons to the acre.

The method of experimenting was to keep the cattle for a certain length of time on the limed land, Fields 1 and 2, then for a similar period on the unlimed land, Fields 3, 4, and 5, and subsequently on the limed land.

The lime was considered by Mr. Harding to have produced a marked improvement in the herbage.

The effect of the lime was also noticeable in the cheese-tub, inasmuch as the curd seemed firmer and better than it was when the animals were on the unlimed land. But neither chemical analysis nor bacteriological examination showed much difference in the curd.

The quantity of the milk was not appreciably affected, so far as one could judge; but it was difficult to determine this, as for

h period the cows would normally be giving a larger yield of k than in the preceding period.

The composition of the milk appears to have undergone but le change, as may be seen from the following figures :—

COMPOSITION OF MIXED MILK.

	Solids.	Fat.	Casein.	Albumin.	Sugar.	Ash.
. 22, limed land	12·50	3·53	2·43	·41	5·45	·68
r 9, unlimed ..	12·54	3·62	2·39	·39	5·48	·66
r 17, limed	12·56	3·60	2·60	·42	5·26	·68
r 25, unlimed ..	12·46	3·44	2·56	·43	5·33	·70

The acidity of the milk appears to have been affected to ne slight extent, for, when upon the limed land, the cows lded milk of slightly higher acidity than they did on the limed.

The following table shows the average acidity of milk during periods named :—

1st period to 16th April on unlimed land	..	..	..	·175
2nd period to 1st May on limed land	..	..	..	·190
3rd period to 14th May on unlimed land	..	..	..	·185
4th period to 20th May on limed land	..	..	..	·190
5th period to 30th May on unlimed land	..	..	..	·190

These results are the average of numerous observations, hence may be that there was a slight improvement in the casein tents of the milk from limed land, and this is supported by above analyses.

Analyses were made to determine whether there was more e in the milk or curd from limed land than from unlimed d. The results showed such great variations from both the ed and unlimed land that no definite conclusion could be wn therefrom.

Bacteriological examinations of the milks and curds were ally negative in their results, which was to be expected, as curd showed no more liability to taints when on the imed land than when on the limed.

Hence, the only results actually obtained were a slightly reased acidity of the milk, probably accompanied with a

slight improvement in its casein contents, and consequently a firmer and better curd.

Considering how important it is to have a firm curd, and in view of the improvement of the herbage on the limed land, there can be no doubt that the liming was beneficial and would have an effect lasting much longer than for the period of the experiments. Moreover, the exceptionally dry season was not calculated to produce the best results which ordinarily accrue from liming. It also necessitated the removal of the cows from pasture to pasture frequently, so that the experiment came to a close at the end of May.

(c.) COMPARISON OF RESULTS OBTAINED, 1891-98.

The following tables give an epitome of some of the results which have been obtained during the past eight years:—

AVERAGE RESULTS OBTAINED, 1891-98.

MONTH.	VALLIS, 1891.				
	Vol. of Milk.	Curd taken from Press.	Cheese when sold.	Shrinkage in ripening.	Cheese from one gallon of Milk.
	galls.	lbs.	lbs.	lbs.	lbs.
April	81	73	69	4	·85
May	119	117	111	6	·93
June	132	132	123	9	·93
July	112	114	107	7	·96
August	91	99	91	8	1·00
September	79	87½	82	5½	1·04
October	52	64	59½	4½	1·14

MONTH.	AXBRIDGE, 1892.				
	Vol. of Milk.	Curd taken from Press.	Cheese when sold.	Shrinkage in ripening.	Cheese from one gallon of Milk.
	galls.	lbs.	lbs.	lbs.	lbs.
April	79	70	66	4	·83
May	109	102	94	8	·86
June	127	122	113	9	·90
July	116	115	108	7	·93
August	100	102½	94	8½	·94
September	84	91	85	6	1·01
October	58	68	62	6	1·07

AVERAGE RESULTS OBTAINED, 1891-98.

MONTH.	BUTLIGH, 1893.				
	Vol. of Milk.	Curd taken from Press.	Cheese when sold.	Shrinkage in ripening.	Cheese from one gallon of Milk.
	galls.	lbs.	lbs.	lbs.	lbs.
April	106	96	89	7	·84
May	149	142	132	10	·88
June	141	130	121½	8½	·85
July	134	129	122	7	·91
August	134	131½	124	7½	·92
September	102½	109½	104	5½	1·02
October	68	80	77	3	1·13

MONTH.	MARK, 1894.						
	Vol. of Milk.	Curd taken from Press.	Cheese when sold.	Shrinkage in ripening.	Cheese from one gallon of Milk.	Average No. of Cows.	Average yield of Milk per head per day.
	galls.	lbs.	lbs.	lbs.	lbs.		galls.
April	103	101	96	5	·93	33	3·12
May	148	148	140	8	·94	50	2·96
June	140	141	132	9	·94	51	2·74
July	129	131	124	7	·96	52	2·48
August	112	118	112	6	1·00	52	2·15
September	100	112	106	6	1·06	53	1·89
October	74	87	81	6	1·09	53	1·40

MONTH.	HASLEBURY, 1895.						
	Vol. of Milk.	Curd taken from Press.	Cheese when sold.	Shrinkage in ripening.*	Cheese from one gallon of Milk.	Average No. of Cows.	Average yield of Milk per head per day.
	galls.	lbs.	lbs.	lbs.	lbs.		galls.
April	126	126	118	8	·94	46	2·74
May	175	167	159	8	·91	61	2·87
June	183	168	159	9	·87	70	2·61
July	146	148	138	10	·95	70	2·09
August	139	152	138	14	·99	70	1·99
September	113	124	119	5	1·05	69	1·64
October	76	90	87	3	1·14	65	1·17

This was excessive in April, July, and August, partly owing to the heat of season, partly to the cheese not being sold so soon as in former years.

COSSINGTON, 1896.							
MONTH.	Vol. of Milk.	Curd taken from Press.	Cheese when sold.	Shrinkage in ripening.	Cheese from one gallon of Milk.	Average No. of Cows.	Average yield of Milk per head per day.
	galls.	lbs.	lbs.	lbs.	lbs.		galls.
April	163	136	130	6	·80	51	3·19
May	166	164	157	7	·94	56	2·98
June	153	152	142	10	·93	59	2·60
July	137	139	131	8	·96	60	2·28
August	107	114	110	4	1·03	60	1·78
September	77	86	80	6	1·04	60	1·28
October	56	66	61½	4½	1·10	50	1·12

LONG ASHTON, 1897.							
MONTH.	Vol. of Milk.	Curd taken from Press.	Cheese when sold.	Shrinkage in ripening.	Cheese from one gallon of Milk.	Average No. of Cows.	Average yield of Milk per head per day.
	galls.	lbs.	lbs.	lbs.	lbs.		galls.
April	92	90	85	5	·92	36	2·55
May	130	124	114	10	·88	45	2·88
June	130	123	113	10	·87	48	2·70
July	102	95	87	8	·85	49	2·08
August	90	85	78	7	·87	49	1·83
September	88	89	83	6	·94	50	1·76
October	79	81	77	4	·97	47	1·68

AVERAGE RESULTS OBTAINED, 1891-98.

LONG ASHTON, 1898.							
MONTH.	Vol. of Milk.	Curd taken from Press.	Cheese when sold.	Shrinkage in ripening.	Cheese from one gallon of Milk.	Average No. of Cows.	Average yield of Milk per head per day.
	galls.	lbs.	lbs.	lbs.	lbs.		galls.
April	84	79	74	5	·88	34	2·47
May	121	116	110	6	·91	44	2·75
June	131	124	119	5	·91	47	2·79
July	103	106	101	5	·93	47	2·30
August	84	82	77	5	·92	49	1·72
September	69	69	64	5	·93	44	1·57
October	68	63	59	4	1·02	47	1·23

AVERAGE YIELD OF MILK.

The average yield of milk at Ashton in 1898 was practically the same as in 1897, as only one cow had been purchased, but most of the cows were bought from Mr. Harding. Hence, any variation in the yield of milk must be attributed mainly to the influence of the season. This was exceptionally dry and warm, and was

probably the main cause of a rapid decline in the milk yields shown in the preceding tables. Whereas the average yield per head per day was almost the same during the month of June in 1897 and 1898, and by October, 1897, had only fallen to 1.68 gallons, yet in 1898 it fell by October to 1.2 gallons per head per day. The yield of milk in October 1897, was thus 33 per cent. more than in October, 1898, from exactly the same number of cows, viz., 47, and from the same pastures.

The yield of curd per gallon of milk up to June was similar to that given in 1897, and was small considering that the cows were not all calved down in the spring. After June, for reasons which will be subsequently pointed out, it improved, although this improvement was marked, so far as the results of 1898 are compared with those of 1897, the results still compare unfavourably with those obtained in former years. At no former Cheese School, except at Butleigh and Axbridge, has the yield of curd taken from press been less than 1 lb. per gallon of milk used for its manufacture, during or after the month of July. Yet at Long Ashton, in 1897 only during September and October and in 1898 only during October, was the yield of curd more than 1 lb. to the gallon. This is the more remarkable, inasmuch as we have already seen that the yield of milk was considerably smaller than in 1897, and, as a rule, a diminished yield is accompanied by an increase in the quality. It is even still more remarkable, considering the steps—to be referred to later on—which were taken to improve the quality of the milk.

(e.) THE QUALITY OF THE MILK.

In April the milk, as will be seen from the table on page 150, was exceptionally poor in casein, and contained much less fat than in 1897. In May there was a slight increase, which was partly lost in June, and not quite regained in July. By August, September, and October, there was a slight improvement over the results obtained in 1897, both as regards fat and casein.

In spite, however, of this slight improvement, the milk yielded at Long Ashton is still conspicuous as having contained less casein during each of the seven months than has been present in the milk yielded at any previous Cheese School.

The result of this deficiency was the small return of curd per gallon of milk already referred to.

In 1897, the milk was similarly deficient in casein, and one of the first objects of these experiments in 1898 was to test and discover the cause. There were two probable causes

**AVERAGE COMPOSITION OF MILK for each MONTH during the
YEARS 1891-98.**

Month.	Year.	Locality.	Total Solids.	Fat.	Casein.
			per cent.	per cent.	per cent.
April	1892	Axbridge	11.75	3.06	2.35
	1893	Butleigh	11.89	3.09	2.43
	1894	Mark	12.31	3.29	2.42
	1895	Haselbury*	12.65	3.70	2.43
	1896	Cossington	12.75	3.83	2.43
	1897	Long Ashton†	12.74	3.87	2.45
	1898	"	12.28	3.48	2.29
May	1892	Axbridge	12.04	3.12	2.55
	1893	Butleigh	12.01	3.05	2.59
	1894	Mark	12.51	3.35	2.73
	1895	Haselbury*	12.58	3.39	2.60
	1896	Cossington	12.78	3.70	2.64
	1897	Long Ashton†	12.42	3.53	2.48
	1898	"	12.52	3.55	2.51
June	1892	Axbridge	12.20	3.17	2.65
	1893	Butleigh†	12.03	3.08	2.65
	1894	Mark	12.52	3.40	2.69
	1895	Haselbury*	12.56	3.51	2.58
	1896	Cossington	12.59	3.57	2.64
	1897	Long Ashton†	12.28	3.42	2.43
	1898	"	12.24	3.38	2.49
July	1892	Axbridge	12.20	3.21	2.66
	1893	Butleigh†	12.14	3.20	2.49
	1894	Mark	12.52	3.47	2.64
	1895	Haselbury*	12.68	3.60	2.67
	1896	Cossington	12.61	3.66	2.58
	1897	Long Ashton†	12.20	3.39	2.35
	1898	"	12.47	3.52	2.50
August	1891	Vallis	12.61	3.87	2.76
	1892	Axbridge	12.28	3.38	2.65
	1893	Butleigh†	12.14	3.19	2.77
	1894	Mark	12.78	3.70	2.76
	1895	Haselbury†	12.82	3.80	2.68
	1896	Cossington	12.73	3.83	2.66
	1897	Long Ashton†	12.45	3.63	2.38
	1898	"	12.71	3.84	2.43
September	1891	Vallis	13.00	4.13	2.99
	1892	Axbridge	12.56	3.57	2.87
	1893	Butleigh†	12.53	3.53	2.95
	1894	Mark	13.05	3.93	2.83
	1895	Haselbury*	13.03	3.94	2.91
	1896	Cossington	13.19	4.31	2.71
	1897	Long Ashton†	12.89	3.86	2.59
	1898	"	12.76	3.91	2.59
October	1891	Vallis	13.81	4.75	3.21
	1892	Axbridge	13.13	4.00	3.08
	1893	Butleigh†	13.49	4.30	3.14
	1894	Mark	13.46	4.39	2.95
	1895	Haselbury*	13.70	4.55	2.92
	1896	Cossington	13.38	4.41	2.85
	1897	Long Ashton†	13.22	4.18	2.71
	1898	"	13.21	4.20	2.75

* For first and third weeks in month.

† For first week in month only.

‡ Once in eight days.

ANALYSIS OF EVENING'S MILK OF INDIVIDUAL COWS AT FENSWOOD FARM, 1898.

or No. of Cow.	Date.	Total Solids.	Fat.	Casein.	Albumin.	Yield.
						galls.
.. ..	Apr. 12 ..	12.92	4.05	2.56	.45	..
bury ..	Apr. 12 ..	13.78	5.20	2.33	.35	..
y ..	Apr. 12 ..	13.18	4.29	2.40	.41	..
.. ..	Apr. 12 ..	13.10	4.01	2.52	.30	..
ore ..	Apr. 13 ..	14.18	4.99	2.34	.38	..
Ashton ..	Apr. 13 ..	13.94	4.50	2.51	.36	..
r ..	Apr. 13 ..	12.86	4.21	2.10	.34	..
.. ..	Apr. 13 ..	11.74	2.96	2.46	.35	..
.. ..	Apr. 14 ..	12.34	3.92	2.40	..	..
.. ..	Apr. 14 ..	12.34	3.73	2.17	.33	..
.. ..	Apr. 15 ..	14.64	5.37	2.10	.46	..
.. ..	Apr. 15 ..	13.90	4.62	2.65	.34	..
.. ..	Apr. 18 ..	11.94	3.66	2.28	.31	..
.. ..	Apr. 18 ..	12.06	2.76	2.68	.57	1 1/2
ry ..	Apr. 18 ..	10.86	2.76	2.00	.35	1 1/2
shire Horns	Apr. 18 ..	10.44	2.72	1.88	.42	1 1/2
.. ..	Apr. 19 ..	12.12	3.52	2.25	.50	2
ry ..	Apr. 19 ..	12.92	3.99	2.04	.33	1 1/2
.. ..	Apr. 19 ..	12.56	3.48	2.70	.33	2
2nd ..	Apr. 22 ..	14.50	4.80	..	.47	2 1/2
.. ..	Apr. 22 ..	12.06	3.43	2.44	.58	2
le Teat ..	May 10 ..	14.92	5.76	2.73	.61	1 1/2
bury 2nd ..	May 10 ..	11.64	2.68	2.48	.36	1 1/2
gton ..	May 10 ..	12.46	3.63	1.27 (?)	1.86 (?)	2
8 ..	May 10 ..	8.66	1.97	1.70	.47	1
horn ..	May 12 ..	12.82	4.07	2.47	.34	1 1/2
teen ..	May 12 ..	9.54	2.26	1.70	.56	1
Red One ..	May 12 ..	11.16	2.76	1.93	.54	1 1/2
n 2nd ..	May 12 ..	13.10	3.78	2.63	.44	2 1/2
nsey ..	May 13 ..	12.74	3.84	1.93	.40	1
it of Five ..	May 13 ..	12.84	3.48	2.77	.49	1
Cow ..	May 13 ..	13.08	3.49	2.80	.41	1 1/2
Teats 2nd ..	May 13 ..	13.34	3.30	3.06	.62	2 1/2
c Teat ..	May 16 ..	12.60	3.78	2.50	.48	1
tail ..	May 16 ..	13.40	4.07	2.64	.44	1
lip ..	May 18 ..	14.52	4.96	3.38	.61	1 1/2
er ..	May 18 ..	13.02	3.73	2.67	.96	1 1/2
.. ..	May 18 ..	13.32	3.79	2.96	.54	1
y ..	May 18 ..	12.26	3.71	2.31	.46	1
r ..	May 27 ..	12.90	3.78	2.67	.35	3
e Rump ..	May 27 ..	12.78	3.61	2.67	.40	2
.. ..	May 27 ..	12.42	3.42	2.34	.42	1 1/2
Teats ..	May 27 ..	13.38	4.32	2.62	.38	2
star ..	June 21 ..	12.86	3.58	1.83 (?)	.37	1 1/2
ny ..	June 21 ..	12.76	3.65	2.70	.67	1 1/2
.. ..	June 21 ..	14.50	4.68	3.27	.43	1
g Lady ..	June 21 ..	13.66	4.29	2.57	.45	1 1/2
l Horn ..	June 23 ..	12.12	3.15	1.32 (?)	.52	1
l Horn ..	June 23 ..	12.96	3.64	2.66	.55	1 1/2
y ..	June 23 ..	11.98	3.14	1.34 (?)	.52	1 1/2
Red Heifer ..	Aug. 16 ..	12.68	3.60	1.74	.30	1
Neck ..	Aug. 16 ..	12.28	3.14	1.12	.42	1 1/2
r ..	Aug. 16 ..	12.72	3.40	1.52	.39	1 1/2

* Cows yielding abnormal milk.

RE.—The results marked (?) are due to the fact that owing to some impurity in the casein it could not be accurately estimated. This condition of casein has been found on several occasions in past years.

Either it was peculiar to the cattle, or it was the result of some peculiarity in the food. If due to the cattle it would probably be much more marked in some than in others, but if due to the herbage or food it would be common to all. Hence, it was decided to completely analyse the milk of every cow in the dairy. This was a tedious process, for only a few such analyses can be carried out at a time, and as the herd was not one kept for cheese-making but for the sale of milk, some cows were being continually drafted out of the herd, and fresh ones introduced.

The work proceeded gradually, and it became evident that the deficiency of casein in the milk was not general, but was peculiar to certain cows. This made it necessary that the milk of every cow, except those soon to be withdrawn from the herd, as being near the end of their milking time, should be fully analysed. The milk of fifty-three cows was examined, and the results of these analyses are given in the table on page 151. Among these cows four were found to give milk of most exceptionally bad quality. These four were tested again and again to make quite sure that no mistake had been made in the analyses. The average results of these tests are given in the following table, as also the average composition of the milk of the remainder of the herd:—

AVERAGE COMPOSITION OF EVENING'S MILK.

	Solids.	Fat.	Casein.
Of four abnormal Cows	10·21	2·52	1·87
Of remainder of Herd	12·95	3·85	2·53

(f.) THE CATTLE YIELDING ABNORMAL MILK.

In the table showing the composition of the milk of individual cows there will be found four animals, Cherry, Ayrshire Horns, No. 8, and Eighteen, who gave milk of such poor quality that it may be called abnormal. It will also be seen that the milk of others was peculiar. Thus, assuming 2·4 per cent. of casein to be a fair minimum amount for milk during the month of April, and 2·5 for milk during the month of May, we find that eight cows tested in the former month, and six in the latter, fell below these standards. The first two were discovered on the 18th April. The milk was again tested on the 21st and 22nd, to make sure that there had been no mistake in the analyses, and was found to be the same. The next step was

to try and make a cheese from the milk of these cows, and see what effect the milk would have. It was only possible to get the milk of three of the cows into the small vat which had been made for experimental purposes. The first thing noticeable was the effect of keeping the milk of the abnormal cows out of the ordinary milk. Thus, on the day preceding this experiment, the composition of the milk of all the cows was as shown in the following table, side by side with which is given the composition of the abnormal milk on the following day, and of the milk from which the abnormal milk had been kept out:—

	Solids.	Fat.	Casein.
June 7.—Mixed Milk of all Cows	12·16	3·31	2·49
June 8.—Abnormal Milk	10·84	2·86	2·00
June 8.—Remainder of the Milk	12·44	3·33	2·57

The effect of keeping the abnormal milk out of the cheese-tub was marked. Miss Cannon reported—"the curd came much firmer and nicer; it was shotty and of a good texture throughout. The curd here has never before been so good." Great difficulty was found in making a cheese from the abnormal milk alone. In the first place, the rennet seemed to have no action upon the milk. It was more than two hours after renneting before the curd set, though with the remainder of the milk, the same proportion of rennet had not only set the curd, but this was fit to cut forty-five minutes after renneting. The curd of the abnormal milk remained soft, and much fat was lost in the whey. The acidity developed very slowly at first, but, when it had started, went rapidly, which has been a characteristic peculiarity of the cheese-making at Long Ashton. The yield was exceptionally small, being only 6 lbs. of curd from 9 gallons of milk.

On June 16th the experiment was repeated. The following is the composition of the two milks on that day:—

	Solids.	Fat.	Casein.
Abnormal Milk	10·74	2·50	1·95
Remainder of the Milk	12·54	3·58	2·52

In order to give this abnormal milk every chance, one quart of stale whey was added to ripen it, and 50 per cent. more

rennet than for the ordinary milk. The result was better, but the yield of curd was only $7\frac{1}{2}$ lbs. from 9 gallons and 1 quart of milk.

The whey did not contain such an excess of fat as on the former occasion, so that the small yield of curd was not due to loss in the whey. But there was one striking peculiarity of the curds of these two cheeses; whereas the abnormal milk curd on the 8th June contained 44.90 per cent. moisture, and on the 16th June, 44.80 per cent., the curd from the remainder of the milk contained on the 8th June, 40.90 per cent., and on the 16th, 42.30 per cent.

These experiments, coupled with the abnormal composition of the milk, convinced me that, to some extent, the disadvantages which had been met with at Fenswood Farm were due to this cause. These four cows gave milk in which all the peculiarities of the Long Ashton milk were concentrated—milk of low acidity and a small percentage of casein, yielding curd which contained an excess of moisture, and a whey which contained an excess of fat, unless special precautions were taken to prevent this fat passing into the whey. Hence, at my request, three of the cows were disposed of. The fourth was kept for rearing calves, and none of her milk was allowed to be sent into the dairy.

All four of these cows had been in the dairy during 1897, two having been bought that year for the purpose of obtaining the quantity of milk required for the School. The other two had been in the herd for some years past, having been bred by Mr. Harding. There was no sign of any disease or peculiarity in these cows. In fact, to all appearance they were as good cows as any in the herd, and their yield of milk, as shown in the table on page 151, was up to the average. The one kept reared two calves well. I took some trouble to discover what became of the three cows which were disposed of, and found that they had gone to a butter-maker. This butter-maker was surprised to find, after the introduction of these cows into the herd, considerable difficulty in churning the cream. This became so troublesome that the three newly acquired cows were suspected, and upon attempting to churn the cream from the milk of these cows separately, it was found almost impossible. The result was that the butter-making from this milk had to be given up, and the cows have been fattened for the butcher. I am of opinion that this abnormal milk is a peculiarity of certain strains of cattle, and I base this opinion not merely on the fact that no special cause could be found for the production of this milk, but because I have, from time to time, come across other cows in different parts of the country yielding similarly abnormal

milk, and have not in a single instance been able to trace its origin to disease.

PRACTICAL RESULTS.

The practical results are important. It is evident that if cheese-makers find exceptional difficulties in making cheese they will have to consider how far these difficulties may be due to the presence in the herd of one or more cows yielding abnormal milk. I have always been opposed to the way in which dairy farmers are in the habit of replenishing their herds with cows, the past history of which they know nothing whatever about. In addition to the risk which farmers run of introducing disease into the herd by this system, it is now evident that they run a further risk of purchasing cows whose milk may materially deteriorate the produce of those which they previously possessed.*

II.—THE RECORD OF OBSERVATIONS.

(a) COMPARISON WITH 1897 AND PRECEDING YEARS.

For the purpose of comparing the general results of the cheese-making in 1898 with those obtained in 1897, it was deemed advisable to make a complete record of observations and set of analyses about three or four times every month at intervals of from eight to ten days. The results of these observations are summarised in the following tables, page 158.

In addition to these observations, which were made by my assistant, Mr. Wm. D. McCreath, a smaller set of observations were made partly for their own use and partly for me, by the pupils attending the School, under the direction and with the assistance of Miss Cannon.

My main object was to show the pupils the necessity of recording daily the most important acidity results obtained. The Society had always recognised the necessity of pupils making daily, in books of their own, notes of the work done. But these books were drawn up some years ago, and since that time the use of the acidimeter has grown so rapidly that it has been considered desirable for some time past to teach each pupil how to use it. The time now appeared to me to have arrived when a record of acidities should be kept in the dairy, which should be not only at all times available for

* At no former Cheese School has the milk of each cow been analysed, so that it is not possible to say whether abnormal cows were present in other herds, nor how far other difficulties in cheese-making may be due to such source.

THE STUDENT'S

PAGE 1.

EVENING'S MILK.								
Day of Month.	Observations on Cattle, Fields, Water Supply, &c.	Volume.	At Night.		In Morning.			
			Temp.	Acidity.	Temp. of Milk.	Temp. of Dairy during night.	Acidity.	
						min.		max.
		galls.	° F.		° F.	° F.	° F.	

PAGE 3.

Day of Month.	Time when Curd cut.	Acidity of Whey before breaking.	Time of breaking.	Time scalding commenced.	Temp. of Scalds.		Time taken in stirring.	Acidity of Whey after stirring.	Time in Scald.	WHEY.	
					1st	2nd				Acidity when drawn.	Acidity of drainings from pilled Curd.
					° F.	° F.	mins.		mins.		

PAGE 5.

Day of Month.	RELATING TO CURD.			Acidity of liquid from Press.	Weight taken to Curing Room.	Loss in Press.	RIPED CHEESE.			
	Temp. in Vat.	Weight when Vatted.	Time of Vatting.				Curd from 1 gallon of milk.	Date when sold.	Weight when sold.	Loss during ripen- ing.
	° F.	lbs.			lbs.	lbs.	lb.		lbs.	lbs.

JORD BOOK.

PAGE 2.

ING'S MILK.			STALE WHEY.		MIXED MILK, &c.			
Acidity.	No. of Cows in Milk.	Total Vol. of Milk.	Volume.	Acidity.	Acidity. before Ren-netting.	Time of Ren-netting.	Ren net added.	Pro- portion.
		galls.	galls.				ounces.	

PAGE 4.

ACIDITY OF WHEY DRAINING FROM CURD.										Temp. of Dairy during day.	
Time Curd taken from Tub.	Temp. of Curd when taken from Tub.	When taken to Cooler.	After 1st cut-ting.	After 2nd cut-ting.	After 1st turn- ing.	After 2nd turn- ing.	After 3rd turn- ing.	After 4th turn- ing.	Salt added.	min.	max.
	° F.								lbs. oz.	° F.	° F.

PAGE 6.

Observations on quality of Curd, Cheese, &c.

s not always possible to mix the whole of the morning's milk together so as to take the acidity.

the pupils, but also such as they might subsequently use in their own homes and work.

It was evident that the record of observations kept by me for scientific purposes was too detailed for the ordinary routine of the cheese-maker; it would not only occupy too much time, but, what is by no means a small consideration with the farmer, would consume too much of the standard soda solution, the cost of which appears to stand somewhat in the way of its more general use. Hence, for this record, I determined to select only the most important data of each day's work.

On pages 156, 157 is a blank copy of the record book kept by the pupils. With the consent of the Society, I propose to publish blank record books of a similar description in the hope that they may remind cheese-makers in the future of the investigations which have been carried on for the Society during the past eight years, and may induce them in their difficulties to turn back to the pages of the 'Journal' and seek assistance therefrom.

(b.) THE ABNORMAL ACIDITY OF THE MILK.

In my Report for 1897* I pointed out that the milk at Long Ashton was exceedingly deficient in acidity. Fresh milk as drawn from the cow has always an acid reaction. By the method of testing acidity introduced by me in 1891, and now very generally adopted throughout cheese-making districts, this may be said to represent from .19 per cent. to .21 per cent. of lactic acid. This acid reaction is due not to lactic acid but to acid mineral constituents, and probably to certain casein compounds present in the milk.

Upon discovering the abnormal milk yielded by the cows Cherry and Ayrshire Horns, it was thought desirable to test the acidity of this milk. The results were, for Cherry .14, and for Ayrshire Horns .13 per cent. These results, it will be seen, are quite exceptional—the average of the herd being .19—and were equally unexpected. I therefore determined to follow up this line of inquiry, and subsequently, side by side with the complete analyses of milk previously referred to, estimations were made of the acidity of each cow's milk. It was then discovered that the acidity of the milk varied generally in proportion to the casein in the milk. This is well shown by the following table, which gives not only the average acidity of the milk of the four exceptional cows, but also the acidity of the

* 'Journal,' p. 151.

other milks, taking the averages according to the proportion of casein they contain.

Milk containing—						Average acidity.
Under 2 per cent. casein	..	..	..	..	..	·14
Over 2 and under 2·5 per cent. casein	..	..	..	..	..	·20
Over 2·5 and under 3 per cent. casein	..	..	..	..	..	·21
Over 3 per cent. casein	..	..	..	..	..	·23

It is generally found that the proportion of solids in the milk is in direct relation to the proportion of casein. We may therefore roughly express these results by saying that the greater the proportion of solids in the milk the higher is the natural acidity of that milk. It appears to me that these results justify the conclusion that the estimation of the acidity of each cow's milk would give the cheese-maker a rough (though not absolutely accurate) guide to the proportion of casein and solids in the milk, and as to its suitability for cheese-making. Any cow yielding milk of very low acidity should be regarded with suspicion by the cheese-maker.

(c.) THE EFFECT OF THE ABNORMAL MILK.

The influence of the abnormal milk of the four cows upon the whole of the milk and the cheese produced therefrom was remarkable; but it can only be appreciated when studied in conjunction with the effect of keeping it out of the mixed milk.

In the first place, this milk, owing to its low acidity and small proportion of casein, diminished the percentage of both acid and casein in the mixed milk.

Effect of low Acidity.—By diminishing the percentage of acid it necessitated a lower percentage of acid being obtained in the curd before grinding, for the lower the percentage of acid in the milk as drawn from the cows the lower must be the amount obtained in the liquid from press. I am of opinion that the acidity of the liquid from press for a fairly quick ripening cheese should be five times that of the evening's milk when brought into the dairy. But here a difficulty presented itself.

Effect of low Casein.—Owing to the deficiency of the milk in casein the curd was wanting in contractile power, so that by the time sufficient acid had been produced in the curd for it to be ground, it was not sufficiently dry—in other words, it had not expressed sufficient whey. Hence, the difficulty was to decide whether to put away the curd when sufficient acidity was developed, although it would not be properly dry and the cheese would consequently ripen rapidly—for a wet curd always ripens more rapidly than a dry curd—or to obtain the requisite dryness with an excess of acidity, which would also make the

esses ripen rapidly and further introduce the risk of producing an acid cheese. Miss Cannon decided to adopt the former system, and, in my opinion, was justified in doing so. It necessarily resulted in certain peculiarities which may be referred to.

(d.) MOISTURE IN CURD.

The high proportion of water in the curd, which was characteristic of the cheese made in 1897 and again during the months April, May, and June, or rather part of June, 1898, was, all probability, due to the influence of the abnormal milk. Experimental cheeses were made with this milk, and on the 10th day the cheese was made as usual with the ordinary milk, in which all the abnormal milk was kept out. The following results will, I think, conclusively prove the effect of the abnormal milk on the moisture in the curd:—

1st Exp.—Curd from the abnormal milk contained water	44·90 per cent.
Curd from the remainder of the milk contained water	40·90 „
2nd Exp.—Curd from abnormal milk contained water	44·80 „
Curd from the remainder of the milk contained water	42·30 „

These results leave no doubt as to the effect of the abnormal milk upon the moisture of the curd; and the considerable fall in the average moisture of the curd in the months of July, August, September, and October, after the cows yielding the abnormal milk had been disposed of, confirms this opinion.* But, at the same time, the observations show that this abnormal milk was not the sole cause of the high proportion of moisture in the curd. Whenever there was present in the milk a peculiar taint—which if it was not the vinegar taint was very closely allied to it—which caused the acidity to rise with unusual rapidity, and necessitated the curd being vatted much earlier than usual, then there was invariably a high proportion of moisture in that curd. It was, therefore, thought desirable to make some experiments to determine whether by adopting a lower temperature for the scald, the requisite dryness could be obtained in the cheese without injuriously affecting its quality. An experimental cheese was made, the temperature

In 1897 the average moisture in the curd during April, May, and June was 42·18 per cent., and during July, August, September, and October 41·5. In 1898, during April, May, and June, it was 42·78, and during the remaining months, 40·91.

of the second scald being 100° Fahr. Next day the cheese was made with an ordinary temperature for the second scald of 95° F., and the following day an experimental cheese was made, the temperature of the second scald being 105° F. The acidity of the liquid from press of these three cheeses was .81 per cent., .83 per cent., and .80 per cent. The effect of the high scald upon the moisture of the curd was not so marked as I had expected, the moisture in the curd scalded to 100° F. being 41.40 per cent., in the curd scalded to 95° F., 40.80 per cent., and in the curd scalded to 105° F., 40.40 per cent. But the effect on the keeping quality of the cheese and on the texture was marked. These cheeses were specially examined by Mr. Hill. In his opinion, that made with a scald temperature of 100° F. was the best of the three and excellent, though it was not quite ripe and did not cut fat. That made with the scald temperature of 105° F. was more solid, very mild, and a good keeping cheese. These results are, in my opinion, most important. They show how largely the keeping quality of a cheese depends upon the amount of moisture in the curd, as well as upon the amount of acidity. I think, moreover, they justify the conclusion that on farms where the milk is either deficient in acidity, poor in casein, liable to yield a wet curd, or to produce a curd which develops acidity with greater rapidity than is desirable, in fact, which, from any cause whatever, produces a very rapid ripening cheese, a second scald temperature of 100° F. is desirable.

It is, however, necessary to point out that when a high scald is employed the curd must subsequently be kept well open, so that by the time the proper degree of acidity is obtained the temperature of the curd shall have fallen to nearly 70° F., in order that it may be fit to vat at once.

An experiment was also made to bring about the contraction of the curd by the use of a larger proportion of rennet, but the resulting cheese was inferior in quality. This confirms results obtained in 1897 since when using an excess of rennet.

LOSS OF FAT IN WHEY.

A large proportion of fat was found in the whey in 1897, and again during the early months of 1898. This was especially marked in the month of April. There can be little doubt but that this result was due to the remarkably small amount of casein found in the milk in that month.

Throughout the whole season the curd was soft, and, in spite of every precaution and the greatest care, the amount of fat in the whey remained higher than it had been in previous

years, 1897 excepted. This induced Miss Cannon to obtain some American curd knives, with which to cut the curd, and experiments were made to test the relative merits of the curd knives as against the breaker. The results of two consecutive tests were as follows:—

American knives used by a pupil, fat in whey ..	·27 per cent.
Breaker used by the same pupil, fat in whey ..	·44 „

The whey was analysed from time to time when the breaker had been used, and again when the American knives had been used, and always with the result that much less fat was present in the whey when the American knives were employed. If Miss Cannon had always used the breaker less fat would, no doubt, have been present in the whey than was found on the average, but the pupils have to make the cheese, and in their first efforts at using the breaker they naturally cause more fat to pass into the whey than an experienced cheese-maker would, especially if the curd is soft and difficult to cut without loss of fat. These results evidently point to the fact that the American curd knives are instruments which might be introduced into Cheddar cheese dairies with advantage. They are mostly employed where oblong tubs are used for the cheese-making, but can be easily used in the circular tubs. Commencing at the side of the tub, the curd is cut once round in a spiral form to the centre with the vertical knives, and similarly once with the horizontal knives. No attempt is made to cut the curd into small cubes. The subsequent breaking of the curd is carried out with the breaker in the usual manner. These experiments conclusively prove what has been stated in former Reports, that to insure the minimum loss of fat the breaker should be as sharp as possible, so as to cut the curd rather than break it.*

(f.) ON THE RIPENING OF CHEDDAR CHEESE.

I was quite convinced that one reason of the failure of the cheese at Long Ashton in 1897 was the rapidity with which it ripened, and its subsequent deterioration. It cannot be too strongly impressed upon cheese-makers that a cheese when ripe is at its best, and from that time it begins to deteriorate. The warmer the room in which the cheese is kept, the more

* Mr. George Gibbons informs me that Joseph Harding objected to a sharp breaker, considering that the curd should not be cut, but broken, as in that case it would break in the weakest part—which would also be the wettest part—and thus the whey would be got rid of.

rapid is both the ripening and the subsequent falling off. Thus it is that cheese made late in the season keeps better and longer than that made early. The early made cheese is ripening in a continually rising temperature; the process of ripening is therefore continually increasing in rapidity. The late made cheese ripens in a continually falling temperature, and therefore the process of ripening is week by week more and more checked. Hence it is that a cheese-room requires to be artificially heated in the autumn or the cheeses will not properly ripen. The temperature of a cheese-ripening room should be about 65° F.

The only possible means of checking the ripening of a cheese beyond a desirable point is to at once place it in a low temperature. I am informed by Messrs. Douglas, who have had exceptional opportunities of judging what temperature is best, that, as the result of their experience, they recommend 40° Fahr., and this temperature is one which would agree with the dictates of science, so far as we are at present able to judge. Still I have reason to think that even at this temperature certain changes will take place, though the subject is one which has not yet been thoroughly investigated. I merely mention it to warn cheese-makers that cheese could not be kept indefinitely even at this temperature.

If a cheese has been made from exceptionally pure milk, the changes which proceed in the cheese, after what may be termed complete ripeness has been reached, are such as will not materially injure the cheese, and they will proceed comparatively slowly. But if any taint was in the milk when the cheese was made, then the changes which take place after complete ripeness has been reached are more rapid and more destructive to the quality of the cheese.

The experience of 1897 had convinced me that the cheese made at Long Ashton was of exceptionally rapid ripening quality, due, as stated in my Report last year, to the presence in the curd, when vatted, of a high percentage of moisture, and the presence in the milk of taints which promoted both the ripening of the cheese, and its subsequent deterioration.

One of the most striking peculiarities of this taint was that it did not show itself in the curd during the early stages of ripening, so that anyone tasting the cheese might reasonably think it would improve with keeping. The Committee, however, had paid dearly for the lesson in 1897, and were not going to repeat it in 1898. Unfortunately the season of 1898 was greatly against the cheese made at Long Ashton, the great and continued heat caused the cheese to ripen even more rapidly than in an ordinary season, though every possible means was

aken to keep the cheese-room cool and well ventilated, an outlet for air being made in the roof, and an inlet in the floor.*

The question, however, arose—if the cheese does not show the taint until it is fully ripe, how can we determine when this ripeness has taken place? Here the results of my past experiments came to my help, and I considered that it was possible to determine the ripeness of the cheese with sufficient accuracy for practical purposes by means of the solubility of the curd and the percentage of soluble acid. Some of the members of the Committee were not prepared to accept this as a test of ripeness, but, after fully discussing the subject, it was decided that this chemical test should be adopted, and that the cheeses should be sold when in my opinion they were fit for sale. The responsibility thus put upon me was great, but I felt confident in the unbiassed test of chemical analysis and acted accordingly. If these cheeses were sold too soon the blame rests upon my shoulders.

The Chemical Test of Ripeness.—If a sample (5 grammes) of curd, taken immediately before being vatted, be ground up in a mortar with 50 c. c. water, and made up to 104 c. c., and the solution, after standing for from 18 to 24 hours, be filtered, it will be found that a certain amount of curd is soluble and has passed into the water solution, as also a certain amount of acid. As the curd ripens the proportion of solid which is soluble in water increases and also the proportion of acid. Hence, the amount of soluble matter and of soluble acid may be looked upon as a test of the progress of ripening, in other words, of the ripeness of the cheese.

In this way during the past season twenty-two samples of curd, immediately after it was ground, have been examined so as to give me a standard for the future, and the average results of these analyses are as follows:

Solids in newly made curd soluble in water ..	4.74 per cent.
Acidity of newly made curd soluble in water ..	1.00 "

The percentage of soluble solids in the curd varies from 3.80 to 6 per cent., though this large amount is rarely found. The soluble acidity is more constant, varying only from .80 to 1.20 per cent. It will be necessary to bear these facts in mind when considering the following table. This table gives the

* A simple method was adopted which might be followed in most cheese dairies. Six two-inch holes were bored in the bottom of the cheese-room door, and a sliding shutter containing similar holes placed inside, by means of which the holes could either be left completely open, or partly or completely closed at will.

* results of the soluble solids and acid which were determined in a number of cheeses at different periods of ripening.

ANALYSES OF CHEESE TO SHOW SOLUBLE CONSTITUENTS.

Date when made.	Age of Cheese when Tested.	Soluble Solids per cent.	Soluble Acid per cent. (as lactic).	Date when made.	Age of Cheese when Tested.	Soluble Solids per cent.	Soluble Acid per cent. (as lactic).
	Weeks.				Weeks.		
April 4	12	14.00	1.80	June 16	11	15.60	2.00
" 9	11	14.80	1.80	" 16	16	17.00	2.40
" 15	8	12.60	2.00	" 25	10	16.00	2.20
" 26	7	12.60	1.60				
" 30	8	14.40	1.60	July 9	13	15.20	2.40
				" 10	13	15.20	2.00
May 5	10	15.00	1.60	" 11	13	15.80	2.00
" 5	15	16.60	2.00	" 13	12	14.60	2.20
" 17	10	15.20	1.60	" 17	14	13.80	2.00
" 17	11	15.60	2.00	" 27	12	13.20	1.80
" 17	15	17.50	2.40				
" 18	15	16.00	2.40	Aug. 6	10	14.00	2.00
" 19	15	16.60	2.40	" 16	9	13.80	2.20
" 25	8	14.00	1.60	" 26	8	12.90	1.40
" 25	13	15.00	2.00				
				Sept. 4	6	12.90	1.20
June 7	12	15.20	2.20	" 14	5	13.10	1.40
" 7	17	17.60	2.60	" 24	4	10.60	1.00

It will be seen from these figures, first, that the proportion of soluble constituents and of soluble acid increases with the age of the cheese. The cheeses of May 5th and 17th, and of June 7th and 16th, show this well.

Secondly, that this increase is not always the same for an equal period of ripening, but this is probably due to the fact that the temperature at which the cheeses are kept is not constant throughout the season. This variation is well seen by comparing the cheeses of April 9th, May 5th and 17th, June 25th, and August 6th. Each of these was analysed at the end of ten weeks, and it will be seen that the August cheese ripened most slowly, the April cheese next, then the May cheese, and lastly the June cheese, which ripened most rapidly. The rapid ripening of the June cheese was mainly due to the great heat of August.

There is one other point about these analyses which must be noticed, namely, that the soluble solids at times increase more rapidly than the soluble acid. This is very probably due to the initial solubility of the curd varying as already pointed out. The figures which have been obtained are not perhaps sufficiently numerous to justify taking the average results

a permanent standard; the following, however, may be noted :—

	Average Soluble Solids.	Average Soluble Acid.
cheeses 8 weeks old or younger	13·2	1·57
cheeses from 9 to 12 weeks old	14·7	1·95
cheeses from 13 to 16 weeks old	15·8	2·20

Prior to the commencement of the observations in 1898, I had made from time to time estimations of the soluble constituents of the cheese, and thus it was that the estimation of the soluble constituents would, I felt certain, enable me to judge of the ripeness of the cheese and prevent a repetition of the mistake made in 1897. In my Report for 1896 I gave the soluble constituents in a cheese, thirteen weeks old, which was of a very good quality and in perfect condition, and these amounted to 14·80 per cent. I therefore decided to take this as my standard for the April cheeses, and to determine as I proceeded whether the standard had to be altered or not.

How this worked out in practice now remains to be told. In the 15th day of June analyses were made of two of the April cheeses, and the results were so high that, in my opinion, it was desirable to at once take steps to sell them, for such arrangements necessarily take time. The cheeses were sold on the 12th day of July for 50s. a cwt. In Mr. Hill's opinion the cheese was fully ripe, there was a slightly unpleasant flavour in several, but as a whole they were better than those made in 1897. Thus the April cheeses, though sold when only from ten to fourteen weeks old, were considered fully ripe. Now, if we examine the analytical data in the preceding table, we shall find that the cheeses of the 4th and 9th April, when only eleven and twelve weeks old respectively, showed nearly as much soluble matter as I had taken as my standard. Hence I felt no reason to alter this standard.

On the 19th of July, the cheeses of 5th, 17th, and 25th of May were tested, and yielded the results seen in the table. In my opinion they were fit for sale, and the Secretary was informed of the fact.

As some of the Committee thought that the cheeses were being placed on the market too soon, two of the May cheeses, viz., 8th and 19th, were kept back in order to determine whether by further keeping they would improve or deteriorate. The rest of

the May cheeses were not sold until the 30th day of August, and fetched 58s. per cwt. These cheeses had not been sold so promptly as I could have wished, and some had already, in my opinion, commenced to deteriorate. On the 6th October, the buyer, when visiting the purchasers of these cheeses, was asked to try them. He informed me subsequently that he found them "hot and stingy," and not worth nearly so much as he had given for them in August. The two May cheeses which were kept back were subsequently tasted, and were not considered so good as when the remainder were sold. In my opinion one had kept fairly well, but not the other.

Further proof of the deterioration of the cheeses by keeping is found in the prices which the first half of the June cheeses realised. On the 1st September, three of the June cheeses were analysed, and found to be fit for sale; but, from some cause or other, they were not sold until the 6th of October. The result was that they were over-ripe, and only fetched 50s. per cwt.

After this date, owing mainly to the elimination from the dairy of the abnormal milk of the four cows previously referred to in this Report, the cheeses were of a different character altogether, and fetched for the remainder of June and the first half of July, 60s. per cwt. The analyses of the four July cheeses, 9 to 13, were started the day they were sold, and the results again show that my standard of about 14·8 per cent. of soluble solids was fairly accurate.

The second half of the July cheeses and those of August, September, and October, were sold on the 14th December, and fetched 60s. per cwt. On the 17th November I tasted many of the cheeses. Not one was hot or stingy, and, though some were not of the finest flavour, yet they were a very considerable improvement on all the cheeses made prior to the 15th June.

a. THE COMPOSITION OF THE CHEESES.

Some of the cheeses were sampled before being sold and analysed. The results of these analyses are given in the following table. These results to be fully appreciated must be compared with those obtained in 1897. The most characteristic point about the cheeses made at Long Ashton in 1897 was the large amount of moisture they contained. The same characteristic moisture was again present in the April cheeses of 1898. But there is a slight improvement subsequently. Thus the cheeses of 14th and 24th July, 1897, when analysed on 19th November, contained 38·60 and 36·05 per cent.

mixture. Those of 20th and 28th July, 1898, analysed on 11th November, contained only 34·50 and 34·60 per cent.

COMPOSITION OF CHEESES.

Date when made.	Date when analysed.	Water.	Casein.	Fat.	Ash.
April 4 ..	June 29 ..	38·40	29·22	28·08	4·30
" 9 ..	" ..	38·10	28·55	29·15	4·20
" 16 ..	" ..	36·10	28·73	31·27	3·90
" 30 ..	" ..	38·40	28·13	29·17	4·30
July 5 ..	Aug. 22 ..	36·70	30·76	28·34	4·20
" 17 ..	" ..	37·80	29·88	28·62	4·20
" 25 ..	" ..	38·70	27·84	29·16	4·30
Aug. 7 ..	Oct. 6 ..	37·00	29·90	28·60	4·50
" 16 ..	" ..	37·50	29·12	28·88	4·50
July 9 ..	" ..	37·30	28·09	30·21	4·40
" 10 ..	" ..	36·90	27·90	30·60	4·60
" 11 ..	" ..	38·20	26·89	30·21	4·70
" 13 ..	" ..	37·40	27·43	30·47	4·70
" 20 ..	Nov. 17 ..	34·50	29·34	31·66	4·50
" 28 ..	" ..	34·60	29·20	32·10	4·10
Aug. 9 ..	" ..	36·70	27·65	31·80	3·85
" 10 ..	" ..	33·00	30·69	32·46	3·85
" 20 ..	" ..	36·40	28·35	31·35	3·90
" 25 ..	" ..	35·50	30·25	30·45	3·80

III.—THE BACTERIOLOGICAL OBSERVATIONS.

(a.) THE VINEGAR TAINT.

The appearance of the vinegar taint in the curd was not long delayed for in 1898, for on 19th April it was present in the curd to a marked degree, combined with the peculiar smell of bay laurel leaves, which was described in my last year's Report. The result was also similar to that produced in 1897, namely, an excessively rapid development of acidity, so that the curd was vatted at 12.10. This was not the first time that the vinegar taint had been present in the curd, but it had not been highly developed on any previous day. It occurred from one time up to the 17th May, then was absent until the 12th June, was present again on the 24th and 25th June, and was not again present during the season. The organism which produces the taint was isolated on several occasions and carefully studied, and was found to be identical with that of 1897. In spite of every effort, I had been unable to

find any difference between it and the *bacillus acidi lactici*, except the marked power which it possesses of producing a strong pungent smell of bay leaves not only in the curd but also, though to a much smaller extent, in a milk culture. It may be a species of lactic acid organism, but on this point I am unable to speak with certainty. Its close resemblance to the lactic acid bacillus renders it most difficult to investigate, for it always seems associated with that bacillus, and I have never been able to find it in any substance where the *Bacillus acidi lactici* was not present. All my attempts to trace its source have proved futile. Although the results obtained have not been conclusive, I think it only right to mention that, so far as can be judged, it is almost always found in stale milk, where this has accumulated, for example, in the crack of a faulty vessel, or in a cloth which has been used to wipe up milk and has not been properly cleaned afterwards. These were proved on several occasions to have been the cause of the taint.

The effect of the vinegar taint was, as has been stated, to hasten the production of acidity. Now, to quote the words of Miss Cannon, "when the curd ripens quickly, i.e. during making, the cheese ripens quickly." This statement I have found by actual observation to be accurate, and Mr. Hill, when examining the cheeses, would always find these cheeses "too acid" or "slightly stinky." The analyses also show that a curd containing the vinegar taint almost invariably had too much moisture. The practical remedy for this taint is a higher scald to obtain a drier curd, and the production of less acid than usual.

(b.) SPONGY CURD.

This was present only to a slight extent, and when present the cheeses always contained one or other of those organisms which have been described in former Reports as giving rise to spongy curd. As then pointed out, the chief source of these organisms is cow dung, which has been allowed to get into the milk either by accident or carelessness. A striking illustration of how this trouble may arise happened at Long Ashton in 1898. One day the curd was terribly spongy. Inquiries were at once made to ascertain what had happened out of the ordinary course. It was found that some of the cows had been allowed to get into a paddock, adjoining the yard, where there was a pool of dirty stagnant water, from which some of them drank and into which of course they went more or less. The cows managed to get into this paddock twice, and each time a spongy curd was produced. To make sure that the water was

to blame I had it examined bacteriologically, and found in it one of the most typical spongy organisms, and this was also found in the curd on the days when it was spongy. This organism when cultivated in gelatine (shake culture) produced abundance of gas, blowing the gelatine into a veritable sponge.

(c.) EFFECT OF SEWAGE.

If even the least trace of cows' dung gets into the milk, it will give trouble in cheese-making. Far worse, however, is the effect of sewage. It not only produces taints similar to those produced by cows' dung but others also. When, therefore, some time later such taints arose in the curd, and it was found that the cows had not been into the paddock adjoining the yard, a new source had to be looked for, and was at last discovered. The field Hop and Mead is on the slope of a hill, on the top of which are some cottages known as Providence cottages. The sewage from some of these cottages is allowed to pass into a receptacle in the rock which, when it is full, overflows on to the Hop and Mead. This appears to have happened early in July, and when the cows were next turned out into this field the curd became both spongy and tainted with a peculiar taint that had not been previously noticed. Now, considering that the landlord had gone to the trouble and expense of having the Bristol Water Works Company's water laid on to a trough in this field, it seems almost incredible that any of the cows would take the trouble to mount the hill and get at this dirty foul-smelling pool in order to try and lick up some of the liquid therein, but such did happen, for the cows were watched, and one or two were seen to do this. The spot was immediately railed off, and that source of trouble and the trouble itself were got rid of.

(d.) THE FÆCAL TAIN.

The taint more frequently present than any other was that known as the faecal taint, so called because the curd when cut or turned gives off a sickly faecal smell, which once smelt can never be forgotten. The cause of this taint is similar to that of the spongy curd, namely, the introduction into the milk of the dirt which comes from the cow herself. In order to obtain the milk as clean as possible it was customary to have strainers placed over the churns into which the milk was placed immediately after milking. This plan, however, has one great drawback, that, when the milk comes into the dairy, it appears clean, though it may have been far from clean when put into the churns.

Cleanliness in milking is the first and primary condition of success in cheese-making, and yet unfortunately it is the most difficult condition of all to obtain. Once the taint was so bad that the strainers were taken away and the men had to bring the milk into the dairy just as it was milked; the cause of the faecal taint was at once apparent, the dirt in the milk being considerable. The faecal taint organisms are more difficult to discover than those of the spongy taint, but the result of considerable work on this subject points to the fact that this faecal taint is produced by a species of *Bacillus coli communis*, which has not the same power of producing gas as that species which produces spongy curd, nor does it produce acidity in the milk; in fact, it has the reverse action, and the acidity very slightly diminishes upon long keeping. Its power of retarding the growth of the *Bacillus acidi lactici* is great, hence the invariable result that curd which contains the faecal taint is slow to ripen, and a late cheese is produced, yielding a liquid from press which contains less acid than was present in the drainings from the curd before it was ground. This is what has been previously described as "the going back of acidity." Upon reference to the table on page 158 it will be seen that the faecal taint was present so frequently during the last four months of the season as to affect the average results, and to show a liquid from press having less acidity than the drainings from curd before grinding.

(e.) BACTERIA AND PLANTS.

In my Report for 1897 I drew attention to the fact that the bacteria found at each of the former sites of the Cheese School on one and the same day were different, and yet were in the main similar to those found at that site in the year when the Cheese School was located there. It was not possible this year to continue these investigations, owing to the work which had to be done in connection with the special difficulties of Long Ashton.

But I thought it desirable to determine if there were bacteria in the plants of the fields, and whether these bacteria were the same or similar. In May, the grass of the limed and unlimed fields was examined, and the bacteria, although in the main similar, were found to be slightly different. Subsequently, when going over the farm with Mr. Carruthers, I noticed the plant, *Linum catharticum* (Purging Flax), was common in some of the fields, but did not appear to be present in others. Might it be that the variations in the bacteria at different sites were partly due to the different plants found at the particular sites? The idea was interesting, and, on

linking of the well-known fact that both animal and vegetable parasites are found to have a marked preference for certain plants, it seemed to me quite possible that, if bacteria were found to be present on the plants, these, too, might exert a selective power. On the 29th June, milk cultures were made with *Linum catharticum* and *Ononis arvensis* (Rest-harrow), small portions of these plants being placed in sterile milk tubes. The result of the examination of these cultures was to show a distinct difference. On 16th July the experiments were carried further. The sterile milk tubes were taken out into the fields. A piece of the plant was gripped with sterile forceps, cut off, and immediately placed in the milk. In this way five plants were examined—*Achillea millefolium* (Yarrow), *Dactylis glomerata* (Rough Cocksfoot), *Trifolium repens* (White Clover)—and the two previously mentioned. Subsequently, plate cultures were made from these, and the bacteria examined more closely. This experiment was repeated on the 10th August; but my assistant could not find the *Linum catharticum*, so only four milk cultures were made, three of the plants being taken from within 18 inches of each other. The bacteria found on the *Trifolium repens* were always very similar—more so than those on other plants. They were characteristic and different in both appearance and chemical action to those on the other plants. The bacteria on each of the four plants, taken at the same time and from the same spot, were different. These are the two principal conclusions which I have come to, from a very careful examination of all the results obtained. It would not be possible here to give in detail a description of the various bacteria found; it must suffice to say that the results lead me to believe that there are distinct bacteria on the various plants, or at least that some bacteria are found more often and more certainly on some plants than on others. The subject is one which cannot possibly be dealt with in a few experiments like these, but is worthy of the most careful attention on the part of botanists. It appears to open up an entirely new field of bacteriology—one of considerable interest, and may be of great practical utility.

SUMMARY OF RESULTS.

To the questions set forth at the commencement of this paper I may now briefly summarise the answers obtained.

No. 1. No evidence that the taints were due to overstocking with sheep could be found. Liming the land was, however, beneficial to the herbage and also improved the curd.

No. 2. The milk at the commencement of the 1898 season had the same exceptional chemical composition as in 1897.

No. 3. This was found to be due to individual cows yielding milk of abnormal composition, and was not peculiar to the whole herd.

No. 4. Not being peculiar to the herd, the abnormal composition cannot be ascribed to the herbage.

No. 5. The low acidity of the milk is also due to individual cows yielding milk of abnormal quality; the acidity of the milk seeming to vary with the proportion of solids in the milk.

No. 6. A better keeping cheese can be produced under these abnormal conditions by raising the temperature of the scald to 100° Fahr.

NOTE.—This temperate, 100° Fahr., seems to have been the original temperature of the second scald, so far back as I can trace the history of Cheddar cheese-making.

Other practical deductions which have been drawn from the observations are:—

That for the production of a rapid ripening cheese, *i.e.* one which shall be fit for market in three months, the acidity of the liquid from press should be five times that of the evening's milk when brought into the dairy.

That the American curd knives produce a whey containing less fat than when the curd is cut with a breaker.

That by cows drinking from stagnant pools, or water containing sewage, taints are produced in the curd.

X.—*The Society's Experiments for the Improvement of Permanent Pasture.** By FRANCIS J. ROWBOTHAM.

It is unquestionably requisite for the success of every kind of experiment that there should be trustworthy data to go upon; also that we should possess some definite idea not only of what we propose to do, but how we propose to do it. Some previous knowledge of the nature of the deficiency of the soil, and of the remedial measures required, is essential in trying experiments with various manures, for practical benefit is not likely

* Owing to special circumstances, climatic and otherwise, the experiments upon Teart Land were temporarily suspended during 1893, but arrangements have been made for continuing them during the present year on some very suitable land (kindly placed at the Committee's disposal by Mr. R. Neville Grenville) at Butleigh, in Somerset. It is intended to thoroughly investigate the subject bacteriologically as well as in its other aspects.—C. T. D. ACLAND, Chairman of Experiments Committee.

result from a purely speculative course of treatment. This is one of the farmer's chief difficulties. Notwithstanding his desire to improve the existing condition of his grass-land, he is hampered at the outset by the want of scientific knowledge to guide him in deciding between the various methods in vogue in different districts; while his inability to fix upon any one treatment calculated to yield a satisfactory result is at the least among the many difficulties he has to face.

TWO PRACTICAL QUESTIONS.

There are two questions, both of practical importance. The first is: How to bring poor or deteriorated pasture up to the level of a recognised standard of excellence? and the second: How to maintain such a standard from year to year with the smallest expenditure of time and money?

The difficulties involved in a practical solution of these questions have for a long time been appreciated by the Society's Experiments Committee and its advisers, and have led the Committee to devise a scheme of experiments which may prove of a sufficiently definite nature to be of practical service to the farmers. In 1895 a number of trials were instituted in various parts of the country, in the hope that they might be continued for such a number of years as would enable the Committee to come to some practical conclusions upon the advantage or otherwise of the methods of treatment adopted.

The following sites were selected by the Committee:—No. 1, Ottery St. Mary, Devon; No. 2, Killerton, Devon; No. 3, Wanstrow, Somerset; No. 4, Sherborne, Dorset; No. 5, West Brinstead, Sussex; No. 6, Yeovilton, Somerset.

In their selection of the experimental sites, the Committee were mainly influenced by the following considerations, viz.:—

1. That there should be every variety of soil and climate.
2. That the sites should be widely distant from each other.
3. That each site should be typical of a large and important district.
4. That each experiment should be on a farm, *the occupier of which should be able and willing to further the objects of the Committee, and have such intelligence and experience as would enable him to do so satisfactorily.*

THE VALUE OF PRACTICAL KNOWLEDGE.

The aid to be derived from the practical experience and intelligent co-operation of farmers was regarded by the Com

mittee as essential not only to the proper conduct of the experiments, but also to the forming of sound deductions from the results. This is clearly indicated by that portion of the fourth paragraph above quoted, and printed in italics. The practical grip the farmer possesses of the productive capacity of his land must be accorded due weight in any system of scientific experiments inaugurated for his benefit. No one knows better than the farmer himself the exact kind of season required to develop the resources of each particular field, or the conditions which cause the herbage to "go back" after it has been brought forward. Such knowledge is the outcome of his experience.

WHAT THE FARMER WANTS TO KNOW.

But what the farmer does not know—or, at least, does not know so well—is *why* the herbage is liable to these fluctuations in quantity as well as in quality; or *why* he should be so much at the mercy of circumstances over which apparently he has no control; or *why*, again, he should be unable to preserve a uniform standard of excellence throughout the grass-land of his farm, instead of being compelled, as so frequently happens, to make up for the loss on one field by the profits of another.

These are a few of the things the average farmer may be said to know very little about, but, it is presumed, he is not unwilling to be enlightened by drawing upon the stores of knowledge accumulated by the patient investigation and experiments of scientific men.

WANTED: A REAL KNOWLEDGE OF GRASS.

Although the average farmer may plead justifiable ignorance in matters which his training may have left him unprepared to grapple with, it must be conceded that the paucity of his knowledge of the component herbage of his grass-land can hardly be excused. Yet what are the facts? A farmer may be a good judge of hay in the crop, but does his knowledge extend to the nutritive values of the different grasses which he grows? Is he able in a mixed meadow to place a value on the different grasses which he desires to encourage, and to discount the value of those he wishes to discourage, or get rid of? Can he estimate the productive value of a pasture, and satisfy himself in what degree it falls short of the desired standard? To the intelligent mind it would appear that unless a farmer is capable of discriminating between the

different grasses as to their feeding value and other properties, and to recognise the true proportion of each in his pastures, he must necessarily be a long way from knowing the value of his grass-land, and from realising what measures should be adopted to improve it.

In a field of average productive power we have an assemblage of plants differing in many essential points, but notably regards—(a) their feeding value; (b) their habit of growth; (c) their power of abstracting food from the soil; (d) their period of flowering, and relative value before and after the flowering stage; (e) their production of aftermath; and (f) in their relative proportions. This ought to convince us of the desirability of devoting some attention to the study of the herbage of pastures. It is also obvious that attention should be given to all plants other than grasses, which, forming a considerable proportion of the herbage, play no slight part in determining the quality of the crop.

THE VALUE OF RELATIVE PROPORTION.

It is important also to ascertain the *relative proportions* of the grasses composing the herbage of a pasture before coming to any conclusion as to its feeding quality as a whole. And at the risk of diverging somewhat from the main object of this paper, this fact may be illustrated by reference to one of the sites (No. 3), included in the present series of experiments. The gramineous herbage of this site comprised the following:—Cocksfoot, Perennial Rye, Dog's-tail, Hard Fescue, Tall Fescue, Cxtail, Timothy, Sweet Vernal, Smooth Meadow-grass, Yellow Oat-grass, Twitch or Bent, Yorkshire Fog, Hassock-grass, Quaking-grass.

Of these fourteen species of grass no fewer than ten—or over 5 per cent.—should be regarded as good pasture grasses, while the remaining four are either useless in themselves, or indicate an unsuitable condition of soil for the cultivation of valuable grasses. It is evident, therefore, that without a definite notion of the *relative proportions* in which these grasses exist in the field, a false deduction might easily be made as regards the productiveness of this particular meadow. It is in the proportion of worthless to useful grasses that the need for improvement in general conditions of growth has been found. Thus, Cocksfoot, which is an all-round good grass, was very scarce; Cxtail and Tall Fescue, both good grasses, were also scarce; Timothy, a grass of high feeding value, was not plentiful; nor were Smooth Meadow-grass and Yellow Oat-grass. On the

other hand, Yorkshire Fog, an absolutely worthless grass, rejected by stock except when pressed by hunger, was abundant; there was also an abundance of Twitch or Bent-grass, a grass of doubtful value, and *one capable of effectually preventing the spread of more valuable grasses*. Lastly, the abundance of Quaking-grass and the presence, in lesser quantity, of Hassock-grass, afforded a sure indication that the land was imperfectly drained.

THE EVIDENCE OF WORTHLESS WEEDS.

If further evidence was wanted of the need for improving this site, it was to be found in the abundant proportion of worthless weeds, such as Carnation-grass, Rush, Wood-rush, Yellow-rattle, Ox-eye, and the Creeping and Acrid Buttercups. The *state* of the soil, indicated by these weeds, was a fact quite apart from any question whether the soil was rich or otherwise in the constituents of plant-food. Even with a soil shown by analysis to contain an abundance of food, something should be known about the relation existing between the food-substances themselves and the *mechanical condition* of the soil, for if these conditions be imperfectly adjusted, it is quite possible to find that the stores of plant-food are being mainly utilised for the support of worthless weeds, which, by reason of certain structural advantages, are occupying space that under improved conditions would be tenanted by valuable pasture grasses.

The remedy in such a case may be easily supplied at small cost, but the nature and extent of the evil, as well as the beneficial measures to be employed, are matters only to be ascertained and determined by careful and appreciative observation.

There may exist some diversity of opinion regarding the advisability of encouraging the growth in pasture-land of certain weeds of doubtful feeding value, but yet known to be harmless to stock; but there can be no question as to the necessity of excluding weeds whose pernicious character is well-known. Yet, too often, we find these plants in undisturbed possession of the borders and ditches, whence, season after season, they scatter their seeds far and wide. This question of weeds in pasture herbage affects in no small degree the successful management of grass-land. Nobody, of course, expects the farmer to share the interest which the "battle of the meadow" arouses in the mind of the botanist; but *it is manifestly to the farmer's interest to realise in a practical way what this struggle*

tween weeds and valuable grasses actually means in pounds, illings, and pence. Although his acquaintance with the herbage of his pastures may not extend to a complete knowledge of the growth and proportionate feeding-value of the various grasses in it, it is clearly to his advantage to obtain definite information as to the plants to be encouraged, and the conditions best suited to their requirements.

AIM AND SCOPE OF THE EXPERIMENTS.

One of the main objects which the Committee had in view in making these experiments was to illustrate broadly and practically certain well-ascertained principles of agricultural science, and also to afford opportunities for observing the habit and growth of various grasses, as well as for making useful comparisons between the effects of different manures upon different plants, upon a variety of soils, and under various conditions. It was not to be a question of a few isolated experiments on a small scale, but the principle of uniform procedure was distinctly arranged in order to embrace a greater variety of conditions, and by giving a wider scope to the inquiry, to increase the possibility of arriving at useful results.

Tentative as such experimental work, however carefully planned, must be—and especially in the first year or so of the undertaking—the Committee neglected no preliminary precaution which might help to ensure success. The soils of the elected sites were submitted for analysis to Dr. Voelcker, who advised as to treatment in accordance with what he found to be wanting or deficient in each case. (The results of these analyses are briefly given in Table I.) Mr. Carruthers subsequently examined the pastures, and reported not only upon the quality of the herbage, but also upon the desirability of renovating in each case; and, as an additional means of imparting to the experiments the quality of scientific accuracy in all matters of detail, the services of a botanist were engaged for the purpose of compiling a list of the plants found on each site, and ascertaining their relative proportions.

By these means the Committee were furnished at the outset with detailed information as to the situation, the soil, and the natural herbage of the sites; and further particulars, relating to the age of each pasture, its drainage, level, dairy reputation, description of seeds sown, &c., were supplied by the occupiers themselves.

The furnishing of these reports comprised the work of the first year (1895). In the month of January, in the following

year, the manures were applied to the plots previously marked out under the supervision of the Society's stewards.

The season of 1896, unfortunately, proved to be an exceptionally dry one, and the experiments were consequently materially hindered, or indeed, in some instances, rendered almost nugatory. (This especially applied to the cases of Renovation, *vide* page 189.) Nevertheless, as the Chairman of the Committee himself pointed out in his Report (*vide* 'Journal,' vol. vii., p. 141), experience had been gained "as to the effect of an abnormally dry season upon pasture, and upon manures, and seed used upon it," and he thought that the Committee would be far from regarding the experience thus gained as valueless.

TABLE I.—SOIL CONDITIONS.*

No. of Site.	Locality.	Nature, thickness of Soil.	Results of Analysis.
1.	Ottery St. Mary	Topsoil loam, 6-7 ins., resting on clay.	Poor in nitrogen and phosphoric acid, and especially so in lime.
2.	Killerton	Topsoil loam, about 2 ft., resting on New Red Sandstone formation.	Deficient in organic matter and nitrogen, and especially in lime; only moderate amounts of phosphoric acid and potash.
3.	Wanstrow	Topsoil sandy, about 4 ins., resting on Oxford Clay formation.	Deficiency of phosphoric acid; small proportions of nitrogen and lime.
4.	Sherborne	Topsoil light loam, about 10 ins., resting on subsoil of gravel, 4-5 ft., to Oolite formation.	Rich rather than otherwise.
5.	West Grinstead	Topsoil stiff clay, about 4 ins., resting on Weald Clay formation.	Poor in phosphoric acid, especially so in nitrogen; and somewhat deficient in vegetable matter and lime.
6.	Yeovilton	Topsoil stiff clay, 6-10 ins., resting on Lias formation.	Marked deficiency of nitrogen, but other kinds of plant food abundant.

The nature of soil covered by the experiments may be said to comprise examples of such soils as come within the category of "ordinary soils of pasture-land."

The following table gives the nature and quantities of the manures applied to each site. If this table be compared with Table I., it will be seen how the deficiencies in the respective soils, as shown by analysis, were met by the application of the manures.

for the Improvement of Permanent Pasture.

TABLE II.—MANURES.

Manure.	No. of Site.	No. of Plot.	Quantity per acre.	Area of P
Stableyard Manure	1	1	15 loads ..	1 acre.
" " " "	2	4	15 " ..	1 "
" " " "	3	4	12 " ..	1 "
" " " "	5	..	10 " ..	Strip across
" " " "	6	1	15 " ..	1 acre
Dissolved Bones	1	4	4 cwt. ..	1 "
" " " "	3	3	4 " ..	1 "
Raw Bone Meal	2	5	4 " ..	1 "
Food Scrapings	4	1	Not stated	1 "
Slit and Lime	6	4	" ..	1 "
Manure	1	3	4 tons ..	1 "
" " " "	2	1	4 " ..	1 "
" " " "	3	5	2 " ..	1 "
" " " "	5	1	2 " ..	1 "
Basic Slag	1	2	8 cwt. ..	1 "
" " " "	2	2	8 " ..	1 "
" " " "	3	1	8 " ..	1 "
" " " "	4	3	8 " ..	1 "
" " " "	5	{2a}	4 " ..	½ "
" " " "		{2b}	8 " ..	½ "
Basic Slag and Kainit ..	2	3	{8 " B.S.}	1 "
Mineral Superphosphate	3	2	{3 " K...}	1 "
" " " "	5	3a	4 " ..	½ "
Superphos. and Kainit ..	5	3b	{3 " S...}	½ "
Ult	3	6	{2 " K...}	1 "
" " " "	5	..	4 " ..	Strip across

In order to appreciate the effect of the various manures on the herbage of the plots, the normal characteristics of the sward, as briefly set forth in Table III., should be compared with the results of treatment in the successive years which follow after the table. In this epitome no attempt has been made to describe in minute detail the changes which have been observed. Such comparison is reserved for a later part of the experiments, when the full effects of the manures shall have been realised, and when sufficient time shall have elapsed to bring about such alterations in the characteristics of the herbage as may be deemed sufficient to warrant a conclusion being made with some degree of certainty as to the utility of the manure for the purpose to which it was applied.

All that has been so far attempted is to record the principal effects of the manures in improving the normal herbage of the plots. The main facts have been observed in each case, and as the results appear to tend towards certain definite conclusions,

have been brought into juxtaposition, so that they may be followed by the practical readers of the 'Journal.'

TABLE III.—CHARACTERISTICS OF NORMAL HERBAGE OF THE SITES.

No. of Site.	Condition of Herbage.	Age of Field.
		Years.
1	Thin, patchy. Principal grasses: Dog's-tail, Perennial Rye, Twitch or Bent, Yorkshire Fog. Clovers abundant. Large proportion of weeds, such as Ox-eye, Buttercup, Cat's-car, Ribwort. Liable to scorch. Poor productive power	8
2	Compact turf of Twitch, Dog's-tail, Hard Fescue, Perennial Rye, Smooth Meadow-grass. White Clover fairly abundant. Few weeds. Field kept down by stock. Good productive quality	20
3	Large proportion of inferior grasses and weeds. Principal grasses: Dog's-tail, Quaking-grass, Twitch, Hard Fescue, Timothy. Clovers fairly abundant. Following weeds abundant: Carnation-grass, Ox-eye, Buttercup, Yellow-rattle, Rush. Poor feeding quality	30
4	Thin, wiry. Principal grasses: Cocksfoot, Hard Fescue, Meadow-grass, Perennial Rye, Timothy, Yellow Oat-grass. Proportion of good grasses notably large, but both grasses and clovers (latter abundant) are stunted and starved. Principal weeds: Hawk's-beard, Chickweed, Ox-eye. Poor productive power. Liable to burn	15
5	Principal grasses: Cocksfoot, Perennial Rye, Twitch, Yorkshire Fog, Timothy. Clovers fairly plentiful. Weeds very scarce. Liable to burn. Herbage of good quality, but suffers from want of moisture in ordinary seasons	18
6	Principal grasses: Cocksfoot, Perennial Rye, Hard Fescue. White Clover abundant. Principal weeds: Buttercup, Hawk's-beard, Silver-weed, Thistle. Herbage variable; owing to changes in character of soil	18

OBSERVATIONS ON COMPARATIVE EFFECTS OF TREATMENT.

1. FARMYARD MANURE (SITES NOS. 1, 2, 3, 5, 6).

In observing the effects produced by this manure one point is brought into special prominence, viz., the remarkable uniformity of the results. In no case out of the five sites on which it was applied did it fail to produce a heavy growth in the first year of treatment; and this notwithstanding the exceptional dryness of the season. This was apparently due to the action of the manure supplying the deficiency of nitrogen in the soil, and also probably, to some extent, to the capacity of the manure for retaining moisture—the effects being just as marked on a soil of light loamy character as on one composed of stiff clay. Such a result was only to be expected from previous experience of farmyard manure; but the chief point to notice is

that the stimulation imparted was of a distinctly *general* (and by no means selective) nature, as weeds and grasses were equally encouraged. Another fact of some interest was that the herbage assumed a much *coarser* growth than on the other plots, i.e. the coarser kinds of grasses, as well as the weeds, seemed to be distinctly favoured at the expense of the finer sorts.* But this rankness to some extent in the first year was attributable to the "sourness" of the herbage, and its consequent rejection by stock.

1897.—The second year showed little if any diminution in the stimulative effects of the manure. On all the plots—with the exception perhaps of Site No. 5—the growth exceeded in abundance and coarseness that of the associated plots. On Site No. 5 there was a tendency on the part of the other plots to level up to the dung, so that the effects of the latter were less marked than in the preceding year. The conditions of this year were, moreover, more favourable to growth all round. A point worth noticing is that the dung appeared to only stimulate the clovers to a comparatively slight extent, so that the amount of bottom growth produced after the early rains was less than on that of the other plots.

1898.—The conditions which prevailed in the earlier portion of this year were very favourable to growth, and on each of the five plots the herbage was luxuriant, contrasting strongly with that of the unmanured portion of the field. The encouragement, however, of the coarser grasses and miscellaneous herbage on these plots formed a striking feature of this year's growth.†

2. DISSOLVED BONES (SITES NOS. 1, 3).

It was decided to try whether the deficiency of phosphoric acid in the soils of these sites (*vide* Table I.) could best be remedied—in the case of Site No. 1 by dissolved bones or basic slag, and in the case of Site No. 3 by superphosphate, basic slag, or dissolved bones—separate plots being used for the experiment.

1896.—Though the soils of both sites were essentially alike,

* In reference to the *coarser* grasses, it should be noted that there is a broad difference in relative feeding quality between certain kinds. Thus, farmers generally are prejudiced against Cocksfoot on account of its tendency to coarse growth, and are inclined to associate it with such a worthless grass as Yorkshire Fog; but, as Mr. Carruthers has truly remarked, the more vigorously a palatable and nutritious grass grows, the better. The distinction made in this article between coarse and fine grasses must therefore be taken to exclude coarse-growing grasses of high feeding value.

† At Rothamsted it was found that whilst the nitrogenous manures stimulated leaf-production, they did far less than the minerals towards *consolidating* the herbage.

the results in the first year were distinctly different. On Site No. 1 the bottom growth was greatly increased, whilst scarcely any improvement whatever could be discerned on Site No. 3.

1897.—In this year, however, the herbage of both plots showed a very marked improvement; and in the case of Site No. 1 the stock evinced a decided preference for the more palatable herbage.

1898.—Under the improved atmospheric conditions that prevailed in the early portion of this year, the plots made good headway. On Site No. 1 the proportion of clover was distinctly increased, and the herbage bore a general resemblance to that on the Basic Slag Plot. On site No. 3 the growth was very strong, though the proportion of weeds was rather larger than on either the Basic Slag or the Superphosphate Plots. A point of interest to note in this year was that the bone manure showed a marked tendency towards the production of grasses and clover—especially on Site No. 3—as compared with the nitrogenous plots.

3. RAW BONE MEAL (SITE No. 2).

Comparing the results obtained with dissolved bones with those produced by raw bone meal, it would seem possible to make a useful deduction. The latter manure was applied with the object of testing (as in the two preceding cases) the relative capacity of the bone meal and basic slag for supplying the deficiency of phosphoric acid in the soil. But the bone meal has failed as yet to produce anything like the results obtained from dissolved bones; and such results were far behind those produced by the basic slag. As, however, the raw bone meal was only tried on one of the sites, no comparative observations of its action under different conditions of soil and situation were possible.

4. ROAD SCRAPINGS (SITE No. 4).

The soil of this site did not appear to be lacking in any special element of plant food, and the above dressing was used with the object of seeing whether the improvement of the pasture could be better effected with it than with basic slag. As the field was obviously overdrained, and moreover was overrun with worthless weeds, such results as were forthcoming were not likely to be very marked. To these drawbacks must be added the droughty conditions which prevailed in the first and third years of treatment. Nevertheless, the herbage of the manured plots showed a decided improvement; though the effects were more noticeable on the Basic Slag Plot than on the Road Scrapings Plot.

5. ROAD SCRAPINGS AND LIME (SITE No. 6).

This mixture was used only on the "teart" site, and with a two-fold object of supplying nitrogen to the soil and mending its mechanical condition. Owing, however, to the dryness of the first season, the manure produced no visible effect, and the experiment was subsequently abandoned.

6. LIME (SITES Nos. 1, 2, 3, 5).

Lime was employed on four of the sites chiefly with the object of meeting the deficiency of this ingredient in the soil, and, in the case of Sites Nos. 3 and 5, with a view to checking the spread of coarse or worthless grasses.

1896.—It was only too evident that the drought of this year almost entirely negatived (except perhaps in the case of Site No. 3) the results of this application. Indeed, the presence of the drought, combined with the heat of the sun, apparently served to increase the dryness of the soil and the scorching of the herbage.

1897.—Under the improved conditions of this year, however, the plots showed signs of recovery, and it was then observed that, though the herbage was less heavy than that of the other plots, it was of a much finer character—among the grasses thus cultivated being Hard Fescue; while it was also noted—in respect of Sites Nos. 2 and 3—that the coarser grasses and weeds had sensibly diminished.

1898.—The third year showed a continued improvement over the preceding years. On Sites Nos. 2 and 3 the results were especially striking. On No. 2 the most abundant grasses were now Oat-grass, Hard Fescue, and Smooth Meadow-grass, with a fine growth of Dutch Clover. On No. 3 a dense growth of fine herbage, including Fescue and Meadow-grass, was produced; but perhaps the most striking change was the almost complete disappearance of Sedge, Rush, and Quaking-grass, which formerly had been so abundant in this plot.

The significance of the change thus brought about is only realised when the results are compared with the normal character of the herbage of both sites. The fact that the action of the lime had been seriously retarded by the adverse season of 1896, serves to render the improvement additionally interesting, since it is probable that within a comparatively short period the herbage of these plots may become substantially modified and consolidated.

7. BASIC SLAG SITES (Nos. 1, 2, 3, 4, 5).

The reasons for using this manure were, first, to test the relative merits of it and lime in making good the deficiency of the latter in the soil (Site No. 1); and, second, to supply phosphoric acid where wanting (Sites Nos. 1, 2, 3, 5). In this latter case the basic slag was to be tested side by side with bone manure and superphosphate. On Site No. 4 it was hoped the basic slag would improve the pasture.

1896.—Despite the adverse conditions which followed the application of this manure, sufficient indication was given that basic slag possesses capabilities of the highest value for the improvement of certain kinds of pasture-land, especially those known as “poor clays.” (See below, Result of Trials at Sherborne.) The most noticeable feature of the improvement in this year was the increase of clovers on each of the five plots. In regard to Site No. 5, in which the two half-plots were treated in different proportions (*vide* Table II.) the evidence was decidedly in favour of the larger application.

1897.—In the second year the improved conditions of growth caused the plots to make considerable headway early in the season. On Site No. 3 the plot produced an abundant leguminous herbage, comprising, besides Dutch and Red Clover, Yellow Suckling, Bird's-foot Trefoil, and Meadow Vetchling (prior to the manuring, these three last-named plants were hardly to be seen). This increase in the leguminous vegetation was accompanied by a marked reduction in the proportion of worthless and injurious weeds, by which the pasture, in its normal state, had been overrun. On Site No. 5 the 4 cwt. half-plot received in the spring an additional 4 cwt. of slag, and was thus brought to the level of the 8 cwt. half-plot. The evidence of growth on these half-plots was somewhat contradictory this year, but in the autumn the preponderance of growth was in favour of the half-plot which had received 8 cwt. in a single dressing. On both half-plots, however, the improvement was very marked, though it should be noted that this improvement was chiefly due to the production of leguminous plants, such as Dutch and Alsike Clover, Trefoil, and Yellow Suckling.

1898.—The third season was marked by a continued improvement of the herbage of the five plots. On Site No. 1 the herbage was rather finer, but in other respects was not dissimilar from the Dung Plot, though its greater depth of bottom distinguished it from all the others. On Site No. 2 the herbage comprised an abundance of Yorkshire Fog, with Foxtail, Sweet Vernal-grass, Hard Fescue, Yellow Oat-

grass, Smooth Meadow-grass, and Dutch Clover. As the inspection was made within the hurdled space only, it could not be definitely ascertained whether the Yorkshire Fog was equally abundant on the remainder of the plot. On Site No. 3 the excellent results observed in the preceding year were fully maintained, with, moreover, a striking decrease in the proportion of weeds. The 8 cwt. half-plot on Site No. 5 showed this year a thicker bottom and a heavier clover plant than the adjoining half-plot.

These results with basic slag may be usefully compared with the Supplemental Report on Trials with Basic Slag in the neighbourhood of Sherborne, published in the 'Journal' for 1898 (vol. viii., p. 134). The fact that the remarkable effects produced upon the poor clay soils of that district were not—on account, partly, of the dryness of the seasons—manifested until the spring of the third year, indicates that while on such soils the effects of the manure may be retarded by dry atmospheric conditions, the beneficial effects tend to increase from year to year; and that with this improvement there appears an improved condition of food-availability in the soil specially favourable to the growth of leguminous plants.

As regards the effect of this manure upon the grasses, the evidence was less conclusive than in the case of the leguminous herbage; but it did not appear from the results of the experiments that the stimulation of clovers had in any case been at the expense of the better grasses of the pasture. On the whole it seemed that the basic slag had, by supplying the necessary stimulus, enabled the clover plant to displace the worthless weeds, and had thus converted a poor clay pasturage, originally supporting only a thin weedy herbage, into a comparatively rich feeding ground.

8. BASIC SLAG AND KAINIT (SITES NOS. 2, 6).

The lack of potash in the soil was the reason for employing kainit on Site No. 2, while it was thought that the kainit might serve to check the rankness of the grass on Site No. 6 ("teart" land).

The drought of 1896 prevented any results on Site No. 6, and, on account of a change in the plan of experiment, the site was subsequently abandoned.

On Site No. 2 the effects produced in the first year were slight, but in the following season the plot showed a good growth of Dutch Clover and Yellow Suckling. This improvement continued during the third year, when the herbage

comprised an abundance of Yellow Oat-grass and was comparatively free of Yorkshire Fog.

9. MINERAL SUPERPHOSPHATE (SITES Nos. 3, 5), and
10. MINERAL SUPERPHOSPHATE AND KAINIT (SITE No. 5).

Superphosphate was one of three manures employed on Sites Nos. 3 and 5 to test its capacity for supplying phosphoric acid.

On Site No. 3 very little result followed in the first year, but in 1897 the effect on both grasses and clover was very marked. In the third year one-half of the plot was re-sown with superphosphate, and the improvement became still more marked—the proportion of weeds on this latter half being greatly reduced.

On Site No. 5 the plot made good headway in the first season, clovers being especially encouraged; and this improvement continued in the second year, though it was then observed that the clovers were not nearly so abundant as on the Basic Slag Plot. In the third year the half-plot with superphosphate alone appeared to be in advance of the adjoining half-plot of superphosphate and kainit; and it was observed that while the basic slag had encouraged the clovers to a more marked extent than the superphosphate, the latter had done more to stimulate the grasses.

11. SALT (SITES Nos. 3, 5).

Salt was recommended in both these cases for checking the spread of coarse and acrid grasses.

During the first and second years the Salt Plot on Site No. 3 showed no appreciable difference, but in the third year one-half of the plot was re-sown with salt, and a very marked effect followed this application. The finer grasses were distinctly encouraged, while the coarser kinds, with Sedge, Rush, &c. were almost entirely eliminated. In this year the herbage of the plot was not only of fine quality, but remarkable denseness. That this marked beneficial change should have been effected within so short a space of time seems to augur well for the continuation of the experiment.

With regard to Site No. 5, although the proportion of Ben grass appeared to have appreciably decreased in the first year over the whole of the salt-strip (and especially where it crossed the Lime Plot), this result was not evident in either of the two succeeding years.

RENOVATION.

Renovation was tried on four of the sites (Nos. 1-4), in the first three cases by a seeded strip crossing the ends of the plots, and in the case of Site No. 4 by a separate plot. Owing, however, to the drought which followed the sowing, the majority of the seeds failed to germinate; whilst in the few cases where sufficient moisture to produce germination was obtained at the commencement of the year, the young plants appear to have succumbed to the drought that followed.

CONCLUDING REMARKS.

The stage already reached with these experiments—though less advanced than could be wished—enables some idea to be formed regarding the effect of the various manures. The results in one or two cases may, it is true, when considered *individually*, be said to partake somewhat of the nature of foregone conclusions—and this remark may specially apply to the case of the Farmyard manure. But, as may perhaps be usefully pointed out, the chief value of these results lies in the opportunity afforded of comparing them with those produced by other and less perfectly known manures, especially when these comparisons can be made side by side on the same soil and under the same conditions. The value of such experiments is further enhanced by comparing one group of results produced under similar conditions of growth with another group of results from the same manures, but under different conditions of soil and situation. Such comparisons may lead ultimately to some definite conclusions; or at any rate, extend our knowledge of the action of certain manures upon various soils, and under various conditions, especially when these have been previously ascertained by means of careful inspection and analysis.

XI. *The Society's 1898 Exhibition of Cider.*

By F. G. FARWELL, Steward.

THE total number of entries in the cider classes at the Cardiff Exhibition in 1898 was 44, being the same number as at Southampton in 1897. The entries were classified as follows:—

CLASS.	CIDER MADE IN DEVON.		ENTRIES.
156.—Cask of Cider (open to Landowners only)	1
157.—12 Bottles of Cider (open to Landowners only)	1
158.—Cask of Cider (open to Tenant Farmers only)	1
159.—12 Bottles of Cider (open to Tenant Farmers only)	1
160.—Cask of Cider (open to Cider Merchants only)	3
161.—12 Bottles of Cider (open to Cider Merchants only)	2
	CIDER MADE IN HEREFORDSHIRE.		
162-167.—No entry	—
	CIDER MADE IN SOMERSET.		
168.—Cask of Cider (open to Landowners only)	1
169.—12 Bottles of Cider (open to Landowners only)	1
170.—Cask of Cider (open to Tenant Farmers only)	8
171.—12 Bottles of Cider (open to Tenant Farmers only)	8
172.—Cask of Cider (open to Cider Merchants only)	2
173.—12 Bottles of Cider (open to Cider Merchants only)	2
	CIDER MADE IN COUNTIES OTHER THAN DEVON, HEREFORD, OR SOMERSET.		
174.—Cask of Cider (open to Landowners only)	1
175.—12 Bottles of Cider (open to Landowners only)	1
176, 177.—Cask and Bottled Cider (open to Tenant Farmers only). No entry	—
178.—Cask of Cider (open to Cider Merchants only)	4
179.—12 Bottles of Cider (open to Cider Merchants only)	7
			<hr/>
			44
			<hr/>

According to the conditions of entry the cider had to be delivered into the Showyard not later than Saturday, May 14th, when the cases were unpacked and both bottles and casks were placed in position. On Monday, May 16th, samples from each entry were taken by the Steward, and sent up the same evening to Mr. F. J. Lloyd, F.C.S., for analysis. These samples were forwarded in special bottles provided by Mr. Lloyd for the purpose.

The results of the analyses were received on Tuesday, May 24th, and were at once entered on cards (as described in my last year's Report), and these were attached to each exhibit. The information on these cards is tabulated, for easier reference, in the annexed Appendices A and B.

Mr. C. Rootes, of Hereford, was the Judge appointed by the Society, and he commenced his duties on the morning of the first day of the Show, Wednesday, May 25th. Sixteen of the exhibits, as against 14 last year at Southampton, were disqualified for having less than 4 per cent. of alcohol, the number of competitors being thus reduced to 28.

In the four Devon classes open to landlords and tenant farmers, Sir John Heathcote Amory and Mr. Haydon had each a walk over in the respective classes open to them. All the four ciders exhibited in these classes were very good, and deserved the prizes awarded to them, Mr. Haydon's bottled cider in Class 4 being especially excellent. In the two classes open to cider merchants, the entries having less than 4 per cent. of alcohol were all disqualified.

In the Somerset classes there was only one entry in the class for casks open to landowners, and this one was not considered by the Judge to be of sufficient merit to deserve a prize, while the only entry in the bottle class received commendation merely. There were 8 entries in each of the two classes open to tenant farmers, and the competition was keen. Mr. Tilley was awarded first prize for both cask and bottled cider, while in the class open to cider merchants, Mr. Allen was successful in obtaining a first prize for cask and bottle against only one other competitor in each class. There were no entries from the county of Hereford.

In the classes open to counties other than Devon, Herefordshire, and Somerset, Mr. Thomson was awarded a first prize both for bottled and cask cider in the classes open to landowners only, but the Judge did not consider any of the exhibits in the classes open to cider merchants to be of sufficient merit to deserve mention.

Eight entries having been awarded first prizes, these eight had then to compete for the Champion Gold Medal offered by the Society for the best cider in any of the classes, and Mr. Rootes eventually gave his award in favour of Mr. W. T. S. Tilley for the cider in bottle exhibited by him in the class open to tenant farmers of Somerset. This competition was throughout very close. So close that between two ciders Mr. Rootes was for a long time quite unable to decide, and, after declaring his decision, was much relieved to find that both ciders were made by one and the same person, and were practically identical—one being in cask and one in bottle. The champion cider was most certainly excellent, having a bright colour, a fine full flavour of the apple, and yet being soft to the palate. It may be remembered that Mr. Tilley won the first prize in the tenant farmer's class at

St. Albans, in 1896, but was hopelessly beaten the following year at Southampton, with a cider of which I gave an analysis in my Report in last year's 'Journal.' Mr. Tilley, after testing the several exhibits at Southampton, said to me, "I know what I have done and where I have made a mistake, but I am not going to be beaten, and I will show a cider next year which shall beat the lot"—bravely spoken words which, backed up by deeds, were worthy of the best traditions of the pluck of the British farmer. It is always gratifying to chronicle success, and I was pleased to hear that Mr. Tilley was able to secure a large order for his cider from the Kitchen Committee of the House of Commons.

The analyses of the apples with which Mr. Tilley scored his great success will doubtless be interesting. They are as follows:—

Name of Apple.	Proportion of each variety used.	Sp. Gr.	Solids.	Acid.	Sugar.	Tannin.
Royal Jersey ..	$\frac{1}{4}$	1.0611	15.52	.15	13.58	.24
Horner	$\frac{1}{8}$	1.0554	13.58	.31	12.19	.19
Kingston Black ..	$\frac{1}{8}$	1.0672	16.60	.61	14.08	.11
Naiah's Bitter ..	$\frac{1}{8}$	1.0670	16.46	.23	14.49	.44
*French Jersey ..	$\frac{1}{4}$					
Gin	$\frac{1}{8}$	1.0587	14.68	.13	13.33	.22

* Analysis not yet obtained.

The cider in cask which ran the bottle cider so close for the Gold Medal, was made from the same apples in the same proportions—the only difference being that one was in bottle and the other in cask. No wonder, therefore, that the Judge had a difficulty in deciding between them.

While there is ample proof that the Society has, by means of its experimental station at Butleigh, and by the very admirable and instructive articles on cider-making contributed to the society's 'Journal' by Mr. Lloyd, done much to improve the manufacture of cider, it is disappointing to find that the efforts of the Society should not have induced more cider makers to enter as exhibitors at its Shows. The entries have been decidedly disappointing. In 1896, at St. Albans, there were 51 entries; in 1897, at Southampton, there were 44 entries; and in 1898, at Cardiff, there were again only 44.

Why were the Herefordshire men all absentees? This county was formerly noted for its magnificent cider. The Herefordshire and Worcestershire Agricultural Society held their Centenary show at Hereford in June, 1898; there were 12 entries for cider

1 cask, 8 of these being from Herefordshire makers, and 24 entries in a bottle, 18 of these being from Herefordshire. Yet the first prizes in both classes went to Gloucestershire men, and the second prize for bottled cider to the Swanley Cider Company, whose local habitation is in Kent. Mr. Rootes, who judged at Cardiff, was one of the Judges.

The entries generally of cider are far from being as numerous as they should be, considering the number of prizes offered. What is the reason? Presumably it is because the conditions imposed by the Bath and West Society, as to the standard of alcohol, have not been acceptable to cider makers generally? Thirty-one exhibits were disqualified at St. Albans for want of alcoholic strength, fourteen at Southampton, and sixteen at Cardiff. Yet how easy it is for any maker to discover the percentage of sugar and alcohol in the fermenting juice, if he will only take the trouble (and there, I am afraid, is where the mischief lies) to use an accurate hydrometer, in order to determine the specific gravity of the juice, and to refer to the Tables set out in the Society's 'Journal' of 1895-96, page 157. Whatever may be the cause, there would certainly appear to be some dissatisfaction, and, at any rate, difference of opinion as to the wisdom of insisting upon a standard of 4 per cent. for all cider. I am told that some cider drinkers require less alcohol, and others an amount of sugar which prohibits the formation of 4 per cent. of alcohol. Shortly after the Cardiff Show I had a letter from one of the Parliamentary representatives for the county of Somerset, asking for the full analyses of the cider which won the gold medal, and the first-prize cask cider, and he added, "I want these analyses for a doctor who likes pure cider to drink and recommend to his patients, and who was interested in hearing about our cider at Cardiff this year." Less alcohol, in my opinion, undoubtedly means preservatives, and then what about sugar? I read some time ago a case in the papers of the conviction of a mineral water manufacturer on an excise prosecution. Analyses showed that his ginger beer contained a little less than 1 per cent. of proof spirit, his hop ale 2·3 per cent., his hop bitters 4·9 per cent., and his hop stout 5 per cent., while the analyst told the Court that he had examined ginger beer which contained as much as 9 per cent. of proof spirit! Of course all this trouble was caused by sufficient care not being exercised in the use of sugar. Whatever other people's tastes may be, I prefer a drink of honest English cider to ginger beer of old standing, or hop stout mellowed with age; the former will not sting like a serpent, or bite like an adder."

While still, therefore, adhering to the views upon the alcoholic standard set out in my Report in the Society's 'Journal'

for 1896, it is evident that cider makers as a class have not yet been convinced, and that they consider the 4 per cent. standard too arbitrary.

I submit with every confidence that the 4 per cent. standard is absolutely necessary if cider is to have keeping qualities without the use of preservatives, and that any matter in the shape of preservatives is not only deleterious to the cider, but in many cases prejudicial to the health of the consumers. A good judge of cider will at once detect the presence of preservatives and reject the cider. This has been done over and over again by the Judges at the Society's Shows, and the analysis has always confirmed their judgment.

On these points the makers have still to be convinced, but with the object of meeting their views a recommendation has been submitted to the Council, and has been sanctioned by it, for the rearrangement of the cider classes, to meet the requirements of those who produce cider of low alcoholic strength, so that there are now two classes, one for cider containing 4 per cent. of alcohol and upwards, and the other for cider containing less than 4 per cent.

As the Landowners' and Cider Merchants' Classes have never been properly filled, it has been decided that these classes shall be discontinued, and so now landowners, tenant farmers, and cider merchants all compete together in the same class, but in their several counties as heretofore. All cider exhibited will be analysed, and any found to contain a preservative, or any cider entered in a class for which it is not eligible, either by containing too much or too little alcohol, will be disqualified.

It is hoped that with these concessions to the wishes of cider makers, the entries may be more numerous, and thus encourage the Society to continue its good work for the development and improvement of the cider industry.

APPENDIX A.—ANALYSES.

No.	Name of Exhibitor.	Specific Gravity at 60° F.	Alcohol by Volume.	Acidity.	Solids per cent.	Award.
1	Sir J. H. Amory, Bart.	1·017	4·55	·45	5·35	1st Prize.
2	Sir J. H. Amory, Bart.	1·021	4·30	·48	5·88	1st Prize.
3	H. Haydon	1·020	4·15	·60	5·76	1st Prize.
4	H. Haydon	1·022	4·25	·48	6·25	1st Prize.
5	W. H. Batting	1·036	2·40	·81	9·28	
6	H. Whiteway & Co. ..	1·021	3·65	·61	5·74	
7	H. Whiteway & Co. ..	1·021	3·45	·60	5·70	
8	H. Whiteway & Co. ..	1·023	3·20	·50	6·10	
9	H. Whiteway & Co. ..	1·022	3·20	·52	5·78	
..	No entry.					
10	J. D. Allen	1·005	5·90	·46	2·63	
11	J. D. Allen	1·005	6·00	·47	2·58	Commended.
12	D. J. Crofts	1·025	4·45	·49	7·18	
13	C. Osborn & Son	1·031	3·20	·33	8·27	
14	T. Pittman	1·029	4·10	·25	8·24	2nd Prize.
15	G. A. Puddy	1·018	4·85	·48	5·84	
16	J. H. Symes	1·022	4·30	·43	6·62	Commended.
17	W. T. S. Tilley	1·021	4·50	·39	6·36	1st Prize.
18	W. T. S. Tilley	1·022	4·00	·33	6·32	V. H. C.
19	S. White	1·012	6·15	·41	4·55	
20	D. J. Crofts	1·022	4·90	·36	6·58	2nd Prize.
21	H. J. Davis	1·035	3·25	·42	9·30	
22	R. W. Scott	1·021	4·65	·31	6·31	V. H. C.
23	W. T. S. Tilley	1·021	4·15	·32	6·41	1st Prize and Champion Gold Medal.
24	W. T. S. Tilley	1·020	3·80	·32	5·85	
25	H. Tucker	1·032	3·85	·42	8·67	
26	H. Tucker	1·021	5·05	·31	6·49	Commended.
27	S. White	1·013	5·95	·43	4·77	
28	W. T. Allen	1·019	5·20	·42	5·90	1st Prize.
29	W. F. Carter	1·022	4·15	·84	6·10	
30	W. T. Allen	1·020	5·05	·47	6·26	1st Prize.
31	J. Watts & Co.	1·025	4·00	·53	7·01	
32	H. Thomson	1·024	4·10	·42	6·94	1st Prize.
33	H. Thomson	1·020	5·55	·43	5·90	1st Prize.
..	No entry.					
34	A. Knight	1·032	2·85	·70	8·36	
35	A. Knight	1·039	2·45	·30	10·08	
36	R. Rout & Son	1·005	7·00	·60	3·20	
37	Swanley Cider Co. ..	1·035	3·25	·54	9·27	
38	Kingsford and Rake ..	1·004	5·30	·35	2·20	
39	A. Knight	1·035	2·65	·52	9·11	
40	A. Knight	1·045	1·45	·60	11·27	
41	R. Rout & Son	1·007	6·85	·61	3·15	
42	R. Rout & Son	1·006	7·05	·54	2·79	
43	James Slatter & Co. ..	1·037	3·50	·60	9·70	
44	Swanley Cider Co. ..	1·025	3·20	·32	6·96	

APPENDIX B.

Class.	No.	Name of Fruit.	Information relative to Fruit.	Soil of Orchard.	General Information.
156. Cider made in Devon. Landowners. Casks.	1	Mixed	Sp. gr. of juice, 1·058. Trees blossom mostly in May; fruit ripens in October.	Alluvial on red sandstone.	Sheep fed in orchard.
157. Bottles.	2	Mixed	Sp. gr. of juice, 1·058. Trees blossom in April and May; fruit ripens in October.	Ditto.	Ditto.
158. Tenant Farmers. Casks.	3	Mixed	Sp. gr. of juice, 54	Heavy loam.	Orchards folded with sheep, pigs, &c.
159. Bottles.	4	Mixed	Sp. gr. of juice, 55	Ditto.	Ditto.
160. Cider Merchants. Casks.	5	Mixed .. .. .	.. .. .	Heavy loam, subsoil clay.	Orchards not manured.
	6	Mixed, equal quantities of Woodbine (sweet), Woodbine (sour), Ellis's (bitter), Red Cluster, and larger proportions of Sweet Alfred.	Trees blossom in April and May; fruit ripens in November. Sweet Alfred and Red Cluster good bearers; Ellis's moderate; and Woodbine good bearers, every other year. All trees of a hardy nature.	Ditto.	Orchards manured with road-scrappings and stocked with pigs. Average weight of Sweet Alfred, 2 oz.; Woodbine, $2\frac{1}{2}$ oz.; Ellis's, 2½ oz.; Red Cluster, 1½ oz.

161. Bottles.	8	Same as No. 6	and Tremlett's end of October. Pound apple excellent bearer, Fair Maid of Devon and Tremlett's generally good bearers, and Woodbines good, every other year. All trees of a hardy nature.	Ditto.	Same as No. 6.	of Fair Maid of Devon and Pound Apple, 2 oz.; Woodbines, 2½ oz.; and Tremlett's 1½ oz.
162-167. Cider made in Herefordshire.	9	Same as No. 7	Sp. gr. of juice, 1·6. Same as No. 6.. ..	Ditto.	Same as No. 7.	
168. Cider made in Somerset. Landowners. Casks.	10	Hornors	Trees blossom in May; fruit ripens in October; good bearers.	Clay.		Orchards fed by cattle and sheep.
169. Bottles.	11	Ditto.	Ditto.	Clay.	Ditto.	
170. Tenant Farmers. Casks.	12	Mixed, Royal Jersey, White Jersey, White Close Pippin, Horners.	Trees blossom in May; fruit ripens in November. The White Jersey and White Close Pippin are good bearers, Royal Jersey a good average bearer, and Horners fair bearers. Royal Jersey and White Close Pippin are of a hardy nature, Horners are fairly hardy, but the White Jersey are not very hardy.	Clay, loam, with clay subsoil.		Farmyard manure used in orchards.

APPENDIX B.—continued.

Class.	No.	Name of Fruit.	Information relative to Fruit.	Soil of Orchard.	General Information.
170. Cider made in Somerset. Tenant Farmers. <i>Casks— continued.</i>	13	Mixed, half Markers or Woolston Pearmain, nearly half Chisel Jersey, small proportion Royal Jersey.	Chisel Jersey blossoms in June (very late), Royal Jersey in May, and Woolston Pearmain late; fruit of Chisel Jersey and Woolston Pearmain ripens in November and December, and that of Royal Jersey in October; Chisel Jerseys are hardy and good bearers, Royal Jersey fairly hardy and fair bearers if good season, and Woolston Pearmain very hardy and very good bearers; Chisel Jerseys are good size, Royal Jersey fair, and Woolston Pearmain large and very distinct.	Loam, subsoil clayey sand.	Orchards manured with lime, earth, and farmyard manure.
	14	Mixed, equal quantities of Chisel Jersey, Harry Masters, and Mill Apple; half quantities of Webber Jersey, Sandford Jersey, and Royal Jersey.	Trees blossom in May; fruit ripens in November; trees are of a hardy nature; Chisel Jersey, Harry Masters, Mill Apple, and Webber Jersey, are good bearers, and Sandford Jersey and Royal Jersey, average. Weight of Chisel Jersey and Harry Masters, 2 oz.; Webber Jersey, about 1 oz.; Sandford and Royal Jerseys, from 1 oz. to 2 oz. 900 lbs. apples to hoghead.	Deep sandy loam.	Orchards manured with farmyard manure.
	15	Mixed, equal quantities of P. Ringson, Hangdowns, Red and White Jerseys.	Trees blossom in April and May, and fruit ripens in October; of a hardy nature and fair bearers. Fruit weighs 60 lbs. per bushel.	Heavy clay.	

17	Cap on Liberty and Broadleaves. Mixed, one-fourth each of Royal Jersey and French Jersey; one-eighth each of Horner, Kingston Black, Naiah's Bitter and Gin.	and Cap on Liberty fair, and produced good. All are of a hardy nature. Jerseys and Kingston Blacks average 8 oz.; Cap of Liberty, 2 oz.; and Broadleaf, 6 oz. Sp. gr. of Royal Jersey juice, 1.070; Horner, 1.054; Kingston Black, 1.066; Naiah's Bitter, 1.062; French Jersey and Gin, 1.068. Trees blossom in May. Horner, Kingston Black, and Naiah's Bitter ripen in October, and the others in November. Royal Jersey, Naiah's Bitter, and French Jersey are of a hardy nature and a fair bearer; Horners and Kingston Blacks, hardy and good bearers; Gin is of a fairly hardy nature and a good bearer.	Heavy clay.	Orchards constantly fed by sheep, pigs, and calves.
18	Mixed, equal quantities of Pip-Jersey and Cadbury; and one-eighth each of Kingston Black and Horner.	Sp. gr. of Pip-Jersey juice, 1.068; Kingston Black, 1.066; Horner, 1.054; and Cadbury, 1.062. Trees blossom in May: fruit ripens in October. Pip-Jersey is not hardy and a shy bearer, with a small fruit; Kingston Black and Horner, hardy and good bearers; Cadbury, hardy and a fair bearer.	Ditto.	Ditto.
19	Mixed, Never Blights, Georges, and other varieties, names not known.	.. .. .	Sandy loam, clay bottom.	
20 21	Same as No. 12. Mixed, Red and Green Jerseys, Cadbury, Kingston Blacks, a few White Jerseys and Horners.	All the trees are good bearers except the Red Jerseys, which are moderate.	Sandy loam, subsoil clay.	Orchards measured with cattle droppings.

APPENDIX B.—*continued.*

Class.	No.	Name of Fruit.	Information relative to Fruit.	Soil of Orchard.	General Information.
171. Cider made in Somerset. Tenant Farmers. Bottles— <i>continued.</i>	22	Mixed, equal quantities of Chisel Jerseys, Kingston Blacks, and Horners.	Sp. gr. of juice, about 1·060. Trees blossom beginning of June, and fruit ripens latter part of November. All trees are fairly hardy. Chisel Jerseys are good bearers, Horners good every other year, and Kingston Blacks are shy bearers.	Rich heavy soil.	Orchard stocked with pigs.
	23	Same as No. 17.	Sp. gr. of juice, 1·034. Fruit ripens in	Sandy loam.	No manure used in orchards.
	24	Same as No. 18.	November. Trees are of a hardy nature		
	25	Mixed, equal quantities of Royal Jerseys, Kingston Blacks, and others.	and fair bearers.		
	26	Mixed, equal quantities of Jerseys and others.	Sp. gr. of juice, 1·025. Fruit ripens in October and November. Trees are of a hardy nature and good bearers.	Ditto.	
	27	Mixed, Never Blights, Georges, and other varie- ties not known.	.. .. ..	Sandy loam, clay bottom.	No manure used in orchards.
172. Cider Merchants. Casks.	28	Mixed, 70 per cent. Nor- ton's Bitter, 20 per cent. Red Jerseys, and 10 per cent. Gins.	Sp. gr. of juice, 1·055. Trees blossom second week in May, and fruit ripens third week in October. All are of a hardy nature and good bearers.	Strong clay.	Farmyard manure used on orchards.
173. Bottles	29	No information given.			
	30	Same as No. 28.	Sp. gr. of juice, 18 in hd.	Red sand- stone.	Pigs fed in orchard.
	31	Name unknown, but locally	Fruit ripens in		

all other than
Devon, Here-
ford, or
Somerset.
Landowners.
Casks.

175. <i>Bottles.</i>	33	Bedminster, Pippin, and Norman.	Trees blossom in May; fruit ripens in October. Bedminster and Pippin are moderate bearers; Normans are good bearers, and of a hardy nature.	Ditto.
176. Tenant Farmers. <i>Casks.</i>		No entry.		
177. <i>Bottles.</i>		No entry.		
178. Cider Mer- chants. <i>Casks.</i>	34	Equal quantities of Skeynes Kernel, Royal Wilding, and Normandy.	Trees blossom in May; fruit ripens in October. Trees are of a soft nature, and good bearers. Average weight of apple, 2 to 4 oz.	Clay.
	35	Equal quantities of Co- warne Red and Nor- mandy.	Trees blossom in May; fruit ripens in October. Trees are of a hardy nature, and good bearers. Average weight of apple, 2 to 3 oz.	Heavy clay.

APPENDIX B.—continued.

No.	Name of Fruit.	Information relative to Fruit.	Soil of Orchard.	General Information.
36	About equal quantities of Crow's Egg and London Pippin. Mixed fruit.	Sp. gr. of juice, 1·0169. Trees blossom in May; fruit ripens in October. Trees are of a hardy nature, and good bearers.	Clay.	No manure used in orchards.
37				
38	Equal quantities of French Apple and Red Pippin.	Sp. gr. of juice, 1·055. Trees blossom in May; fruit ripens in October. Both are good bearers, and the French apple is of a hardy nature.	Clay.	Orchard dressed with farm-yard manure.
39	Same as No. 34.	Trees blossom in May; fruit ripens in October. Trees are of a soft nature, and good bearers. Average weight of apple from 2½ to 4 oz.	Heavy clay.	
40	Skymes Kernel	Sp. gr. of juice, 1·0172. Trees blossom in May; fruit ripens in October. Trees are of a hardy nature. Blenheim Orange a good bearer, and Ribstone a fair bearer.	Clay.	No manure used in orchards.
41	About equal quantities of Blenheim Orange and Ribstone.	Sp. gr. of juice, 1·0272. Trees blossom in May; fruit ripens in October. King Pippin and Water Pippin are of a fairly hardy nature, and good bearers; Russett of a hardy nature, and good bearer.	Clay.	Orchards dressed with farm-yard manure.
42	About equal quantities of King Pippin, Water Pippin, and Russett.	.. ..	
43	.. ..	.. ..	Clay.	Orchards grazed with sheep.
44	Mixed fruit.	.. ..	

171
Cider in
n County
other the
Devon, H.
ford, or
Somerset.
Cider
Merchants.
Casks—
continued.

179.
Bottles.

XII.—*Investigations into the Manufacture of Cider. Report for*
1898. By F. J. LLOYD, F.C.S.

THE investigations into the manufacture of cider, which have been carried on at Butleigh for the past few years, become of necessity each year more difficult, more scientific, and more abstruse. Not that they are less practical than they have been in the past, for no work is entered into which does not appear to serve a practically useful purpose. Yet considering the great strides of progress which have resulted from the past investigations, it is not reasonable to expect that each year can bring forth equally important results. Another consideration which must be borne in mind is, that the progress of these investigations is necessarily slow. For example, a difficulty may arise after all the apples have been ground and when all the juice is fermenting, which may upon consideration necessitate experiments commencing with the unfermenting juice. Such experiments have to be delayed until the next season. They are then started, and the results of this work will be visible the following year, so that some of the experiments cannot be reported on until two years after they were first conceived, while nearly all must of necessity wait from one season to the next. Thus the experiments which have to be reported on this year were commenced in 1897; while those commenced in 1898 will have to be reported on in 1899. The scientific work carried on at Butleigh is therefore divided into four parts—first, the continuation and clearing up of experiments started the preceding year; secondly, the commencement of new experiments; thirdly, the careful recording of all the work done in the ordinary course of cider-making, together with the analyses which these records demand; and lastly, the continuation of the apple analyses. The work is of necessity crowded into a few months, and requires all the time of my able assistant Mr. Wm. McCreath to be devoted to it.

THE SEASON.

The season of 1898, as will be seen from the following tables (page 204), compiled from statistics kindly supplied to me by Mr. R. H. Scott, F.R.S., Secretary of the Meteorological Society, was exceptionally dry and warm.

The Effect of the Season upon the yield of apples was injurious, there being a much smaller yield than the average. As regards the quantity of juice which these apples yielded, the effect was not striking. 1,000 lbs. of apples yielded

379 lbs. pomace, and 621 lbs. juice, which is only 6 lbs. more juice than was obtained in 1896, and 5 lbs. more than was obtained in 1897.

WEATHER REPORT, 1898.

AIR TEMPERATURE AND RAINFALL, 1898. AVERAGE OF CLIFTON AND CULLOMPTON.

MONTH.	Air Temperature.		Rainfall.	
	Min. and Max. Combined.	Difference from Average.	Total fall in Month.	Difference from Average.
April	48·3	+1·0	2·14	-0·11
May	52·2	+0·2	3·78	+1·57
June	57·8	-0·2	1·53	-0·66
July	61·3*	0·0*	0·45	-2·77
August	63·1	+2·5	2·80	-0·38
September	60·6	+3·8	1·36	-1·90
October	53·2	+4·5	5·74	+1·84

* Obtained at Cullompton only.

BRIGHT SUNSHINE RECORD AT CULLOMPTON, 1898.

MONTH.	No. of Hours recorded.	Difference from Average.	Percentage of possible Duration.	Difference from Average.
April	166·4	+ 9·1	40	+ 2
May	161·1	-37·6	34	- 3
June	185·3	-15·2	38	- 3
July	218·8	+44·7	45	+ 9
August	172·3	- 5·9	39	- 1
September	196·7	+56·7	53	+16
October	68·4	-26·1	21	- 8

The average quality of the juice was better than in 1897, though not so good as in 1896 or 1893, as will be seen from the following table

COMPOSITION OF JUICE FROM PRESS.

Year.	No of Samples.	Specific Gravity.	Solids.	Acid.
1893	6	1·060	14·40	·63
1894	11	1·050	11·14	·60
1895	13	1·052	12·24	·46
1896	5	1·057	14·02	·40
1897	10	1·053	13·26	·68
1898	5	1·056	13·62	·51

These results seem to point to the fact that the influence of season is more marked on the acidity of the apple juice than in any other respect.

The effect of the season upon individual varieties of apples is seen in the table on page 206. Here we find that the apples of 1898 were all much smaller than in 1897 or 1896, in fact, I have never seen the apples at Butleigh so small as they were this season. These apples in most cases also produced a smaller percentage of juice. Hence the quality of that juice was, as a rule, better than in 1897. I noticed, however, that in the early part of the season the quality of the juice from press was not so good as might have been expected. This led me to investigate the cause, which was found to be as follows.

Thinking that there might not be enough apples for the experiments from the ordinary sources, Mr. Neville Grenville purchased the apples from an orchard on a different soil, which had the reputation of producing good cider. But the juice from these apples proved to be of such poor quality, the average specific gravity being only 1.0538, and the solids under 13 per cent., that they reduced the quality of the juice much below the average of the year for Butleigh. This shows the necessity of care when buying apples for cider-making, and that they ought to be paid for according to the quantity and quality of the juice they yield.

VARIETIES OF APPLES.

In continuation of the work commenced in 1895 there have been analysed during the past season forty-seven varieties of apples from various sources, the results of which analyses are given in the Appendix hereto. These analyses now bring the number up to two hundred and twenty, and afford the most complete record of the composition of English cider apples extant, so far as I am aware. It is interesting to note that while in nearly all instances the average weight of the samples in 1898 was below that of the same variety in 1897, yet in many cases the composition of the juice of these smaller apples was almost the same as that of the larger apples produced in 1897.

MANIPULATION.

While ever on the look-out for any improvement in the methods of manipulation which might bid fair to produce results commensurate with the trouble or expense involved, the results obtained in the past by the methods now in vogue at Butleigh have been so satisfactory that no alteration was deemed necessary in 1898. It has been proved that cider made under the conditions and with the care now practised

COMPOSITION OF THE JUICE OF VARIOUS APPLES.

Name of Apple.	No.	Average weight of apple.	Per cent. of juice.	Specific Gravity.	Solids.	Acid.	Grape Sugar.	Cane Sugar.	Tannin.	Extrac- tives, Ash, &c.	Grower.	District.
		oz.			per cent.	per cent.	per cent.	per cent.	per cent.	per cent.		
Kingston Black ..	1898	1.8	53	1.0691	16.90	.57	10.81	4.31	.182	.998	J. C. Waterman ..	Baltusboro' S.
	1897	2.3	67	1.0806	14.86	.48	10.64	3.24	.126	.374	Do. ..	Do.
	1896	1.71		1.0691	17.30	.34	13.06		.440		Do. ..	Do.
Blenheim Orange	1898	2.4	35	1.0674	15.66	.58	10.64	3.24	.078	1.122	R. Neville Grenville	Butleigh S.
	1897	3.5		1.0683	16.64	.79	14.14		.140		Do.	Do.
White Jersey ..	1898	2.70	55	1.0642	15.74	.42	11.62	2.26	.114	1.926	J. C. Waterman ..	Baltusboro' S.
	1897	2.54	58	1.0519	12.68	.26	8.65	3.43	.210	.130	R. Neville Grenville	Butleigh S.
	1896	2.87		1.0581	14.68	.22	13.25		.150		J. C. Waterman ..	Baltusboro' S.
Chisel Jersey ..	1898	2.00	65	1.0542	13.46	.32	9.80	2.39	.244	.706	J. H. Symes ..	Marlock S.
	1897	2.90	58	1.0542	13.50	.31	11.11	1.71	.264	.106	R. W. Scott ..	Kingsbury S.
New Cadbury ..	1898	1.8	50	1.0642	15.68	.31	12.50	2.20	.232	.438	J. F. Millard ..	Butleigh S.
	1897	2.3	62	1.0539	12.68	.96	9.06	1.68	.174	.806	R. Neville Grenville	Do.
	1896			1.0598	14.84	.40	13.09		.180		Do.	Do.
Red Jersey ..	1898	1.5	58	1.0611	14.98	.31	12.04	1.85	.314	.446	J. C. Waterman ..	Baltusboro' S.
	1897	2.66	68	1.0596	14.50	.30	10.87	3.01	.124	.196	Do.	Do.
	1896	3.10		1.0616	15.64	.23	14.10		.290		Do.	Do.
Butleigh No. 14 ..	1898	1.3	50	1.0988	23.22	.40	18.18	2.22	.380	2.040	R. Neville Grenville	Butleigh S.
	1897	2.0	50	1.0790	20.24	.21	13.18	4.94	.800	1.610	Do.	Do.

of good quality both as regards flavour, appearance, and keeping properties. The cider, except that which is stored in bottle, must of necessity be stored in large casks. When it was required to send away a small barrel, containing 12, 18, or 36 gallons of cider, it was necessary to draw this quantity from one of the large storing barrels. Experience soon proved that the cider in the storing barrel did not retain its high quality after this abstraction had taken place. Now the reason for this is simple. If 18 gallons of cider are taken out of a barrel the same volume of air must be drawn in. The result is nearly always injurious to the cider. In the first place the air so drawn into the barrel is liable to be polluted with germs which might set up an undesirable fermentation. Even if this air be first purified by passing it through a special bung made for the purpose, such as that of Monsieur P. B. Noel, of Paris, the air which enters may still be productive of harm by starting fermentation anew, or by enabling the acetic acid ferment, should it be present in the juice, to commence its baneful action. To overcome these difficulties, a cylinder of compressed liquid carbonic acid was obtained in 1897 from the Carbonic Acid Gas Company, and Messrs. Barnett and Foster were kind enough to lend me a pressure gauge and reducing valve, which apparatus is necessary to enable us to use the gas. By connecting the cylinder of carbonic acid gas with a barrel, it is possible to draw from this barrel as much cider as is required without allowing any air to enter, the place of the cider being immediately taken by the carbonic acid gas. This same gas is produced by the natural fermentation of the apple juice, and acts as a preservative so long as the juice is thoroughly impregnated with it. Hence by its application in this way we do but maintain artificially the condition which nature has brought about in a cask ordinarily. There is this further advantage. When cider is in cask it is, or rather should be, fully impregnated with the gas produced by fermentation, but in drawing the cider out of the cask, much of this gas is lost. If, however, the cider be drawn out of the cask by or under pressure, then there is much less fear of the gas escaping when the cider is being drawn into a small barrel. The result is that the cider in this small barrel will keep longer, and be of better quality, than it would had the gas been allowed to escape. The above results are of importance, not only to the cider-maker, who has to draw cider from large into small barrels, but also to those who wish to bottle nearly dry cider, or to produce a bottled cider which, while having ample life when the bottle is open, shall yet not have the superabundant effervescence of champagne.

FERMENTATION.

White Head.—As in 1897, so again in 1898, the fermentation of the juice in the keeves produced abundant white frothy heads instead of the brown heads of former years. As stated in my last report this is “undoubtedly a sign of rapid fermentation, not only in the keeve but subsequently in the barrel.” The results of the 1898 observations fully confirm this statement, in fact, the fermentation was so rapid that it was difficult to deal with the juice. Here fortunately the constant use of the hydrometer, by which we watch the rate of fermentation in every barrel, has been of great service, for it enables us to judge which barrel first needs racking, and how often to rack in order to obtain the juice at the right gravity for filtration. But cider-makers are no more able to do two things at once than are other people, hence, if it is found necessary to commence racking some of the juice, the process of grinding and pressing must be postponed until this racking has taken place. Probably in ordinary practice the white-headed fermentation is most injurious, because cider-makers will neither use the hydrometer nor stop making in order to attend to that which has been fermenting, and is fit for racking. “Make it all, rack it all, risk it all,” seems to be the motto of the farmers. Many have been the experiments, and considerable the amount of time devoted to the investigation of the cause of this peculiar fermentation; but without success. It is needless to particularise these experiments; in time I hope to be able to record a successful experiment which shall throw light upon this problem. Meantime everything points in the direction of its being due to the presence on the apples of certain yeasts, and that these are, in some way not yet understood, related to the peculiarities of the season. Perhaps it might be well to state briefly the main results of this season’s work on which the above statement is founded. After analysing the separate varieties of apples the juice from each variety was allowed to ferment. Of the forty-seven varieties only two produced brown heads. This, I think, does away with the supposition that the white head can be due to any peculiarity in the composition of the juice of the apple, and forces us to the conclusion that it must be due to yeasts. The microscopical examination of the white heads confirms this opinion; but I have not as yet succeeded in separating a variety of yeast which will produce this result.

Pasteur wrote, “*La levure n’est mûre que quand le raisin est mûr.*” The yeast is only ripe when the grape is ripe.

It has occurred to me that the same may be true of the

yeasts which are found upon the apple, and if so we should certainly expect the yeasts to have been fully ripe in the season of 1898, as also in that of 1897. Being thus ripe they would naturally have a more powerful action than in a season when they were not ripe, and this would account for the rapid fermentation of the juice. Whether it would also account for the production of a white head, and if so, why, yet remains to be proved.

It has been found by experiment that under these conditions of rapid fermentation it is necessary to keep the temperature of the keeve room low. Thus, the average temperature of the keeing room being 54° Fahr., as an experiment one keeve was kept down to 43° Fahr. The progress of fermentation was slow, and when filtered on the 5th January, 1898 the juice had the following composition: sp. gr., 1·032; acid, ·59; alcohol, 2·45. It was again analysed on the 10th November, 1898, and then had a sp. gr. of 1·0296; acid, ·45; alcohol, 2·45. Thus, very little fermentation had taken place, the acidity had decreased, and the cider was very sweet and of excellent flavour.

Facility in Filtering.—A result which this experiment brings prominently forth is that if the cider be well filtered very little fermentation will take place subsequently. This has been found to be true both for cider in cask and cider in bottle. One may ask, if this be so, why is not all cider well filtered? Experience proves that some cider can be filtered easily and well, while some is most difficult to filter. This matter has been watched now for some years, and it has been found that with a white head and rapid fermentation the cider never clears naturally as it does when a slower fermentation has taken place. With a slow fermentation the cider will frequently clear so well that it may be drawn off into bottles without filtration. But this is the exception and not the rule.

When the cider originally ferments with a white head it is necessary to frequently rack it, in order to reduce the rate of fermentation, and thus to obtain a fairly clear and slowly fermenting liquid to filter.

SMALL CIDER.

The object of the experiments on small cider in 1897 was to ascertain, among other points, whether there was any substance as good as or better than pure cane sugar for adding to the juice to bring up its gravity, as described in former Reports. Two substances had been suggested as likely to prove of value, one used by brewers and called "Saccharum," and the other "sugar-candy." Experiments were made with both of these

substances, and the results proved conclusively that neither of them produced so good a small cider as pure cane sugar.

PURE YEASTS.

Cultures of pure yeasts were prepared and the cider made with them confirmed the result obtained in former years, namely, that the yeasts give a distinct flavour to the cider, according to the variety of yeast employed. In some instances the resulting liquid has been more like wine than cider, having a slight but distinct wine flavour. Further experiments on a larger scale were started in 1898, which will be reported on in 1899.

CHECKING FERMENTATION.—PRESERVATIVES.

Every cider-maker is pestered with advertisements of anti-ferments that are guaranteed to cure all the evil results of carelessness and ignorance in cider-making. No one therefore can wonder at these having a ready sale among those farmers who little understand their composition and place implicit confidence in the claims of the respective vendors. The use of preservatives in articles of food had attracted much attention in 1897. I knew from the results of analyses that much cider contained preservatives. And as the use of preservatives in articles of food was likely soon to become the subject of legislation, I decided to start a series of experiments on preservatives to determine the effect of each.

Experiment 1.—To a 12 gallon barrel of juice was added a patent preservative—which we will call “A,”—according to the directions supplied with the preservative. The gravity of the juice when the preservative was added was 1·0457 on 4th November, 1897. On 8th January, 1898, the cider was clear, of good flavour, and not very acid, but the gravity had decreased to 1·037, showing that fermentation was taking place. On 8th November, 1898, the cider was analysed and had the following composition: sp. gr., 1·0043; acid, ·70; alcohol, 1·50. It will be seen that the fermentation had continued as if no preservative had been added.

Experiment 2.—A further experiment was made on cider in which, using another patent preservative, which we will call “B.” One bottle full of this substance was added in accordance with the printed directions to one hogshead of cider, which then contained 1·55 per cent. alcohol and 9·20 sugar, and had a sp. gr. of 1·0409. This juice was analysed again at the end of three weeks, and again at the end of another three weeks, and was found to be fermenting rapidly. On the 8th November, 1898, it was analysed with the following results: sp. gr.,

1·0053; acid, ·64; alcohol, 4·70, from which it will be seen that the fermentation had gone on nearly to dryness. This substance also proved a failure.

Experiment 3. Mustard.—I had heard that in Devon the sweets were retained in the cider by the use of mustard, and so it was determined to give this substance a trial also. The quantity generally used was stated to be 1 lb. to the hogshead. 2 lbs. of the best mustard were therefore added to a 2 hogshead barrel of cider having a sp. gr. of 1·0427. The juice was analysed three weeks afterwards, and found to be fermenting, and again three weeks later. Fermentation had then nearly stopped, but the acidity of the juice was rising. One year after, namely, on the 8th November, 1898, this juice was analysed. Little or no fermentation had taken place during the ten months, but the acid had risen from ·70 to ·85, and the cider had a strong and most unpleasant taste of garlic; in fact, it was spoilt. This being the only experiment with mustard, the evil results obtained may be exceptional, while its power to check fermentation appears to be proved.

Experiment 4. Formic Aldehyde.—This and the three following experiments were made with juice drawn from the barrel when racking and not filtered, and were carried out in bottles.

The effect of the formic aldehyde upon the cider was most remarkable. It produces an abundant precipitate, causes the cider to become opaque and like very dirty milk. By degrees this substance begins to settle, but so slowly does this settlement take place that after standing for one year the cider is not clear. In this experiment the quantities of Formic Aldehyde used were ·05 per cent., ·1 per cent., and ·2 per cent. respectively. Three bottles were similarly treated in each experiment. This substance was found to completely check the fermentation, the cider having on 1st December, 1898, the same gravity as when put into the bottles a year previously. But the sediment which is produced renders the cider absolutely unfit for anything, and it has not been found possible to take out this milkiness by any process which I have tried.

Experiment 5. Boracic Acid.—This substance was used in the same proportions as the preceding, only by weight instead of by volume. ·05 per cent., ·1 per cent., and ·2 per cent. were each added to three bottles of cider. Neither of these quantities had any effect; the cider fermented to absolute dryness.

Experiment 6. Sodium Salicylate.—0·1 per cent. of this substance was added to a bottle of cider, but the bottle was lost or burst, and no analysis was made.

Experiment 7. Pasteurising.—Three bottles were Pasteurised at 120°, three at 140°, and three at 160° Fahr. for fifteen

minutes. Three out of the nine bottles broke from the effect of the heat. A temperature of 120° Fahr. had no effect upon subsequent fermentation, which proceeded until the cider was absolutely dry. A temperature of 140° Fahr. checked fermentation slightly, and that of 160° Fahr. still more so, but neither had completely checked the fermentation.

It was next considered desirable to conduct some experiments on filtered juice. All the following experiments were carried out with the same juice, which had the following composition: sp. gr., 1·0169; acid, ·68; alcohol, 3·55; solids, 5·34.

Experiment 8. Formic Aldehyde.—·01 per cent., ·05 per cent., and ·1 per cent. respectively. The formalin had the same action on the filtered cider as on the unfiltered, producing the white cloudiness or milkiness as before. No fermentation had taken place when these bottles were analysed in November, 1898, i.e. eleven months after being filled.

Experiment 9. Borax.—·1 per cent. and ·05 per cent. respectively. Both these samples fermented slightly, but the colour and the flavour were found to have suffered by the use of this preservative.

Experiment 10. Sodium Salicylate.—·05 per cent. and ·01 per cent. Fermentation was checked, but not completely. The bottles contained some gas though not enough. The substance had no injurious effect upon the flavour of the cider.

Experiment 11. Pasteurisation.—This was carried out at 120° Fahr., and no subsequent fermentation took place, so that, at the end of eleven months, the liquid was "as dead as ditch water."

Experiment 12.—Anticipating the result obtained in Experiment 11, the cider was Pasteurised, and then a small quantity of pure yeast was added to it. Fermentation proceeded slowly and a considerable amount of gas was produced, but the fermentation had not gone very far, for on 2nd November, 1898 the juice had the following composition: sp. gr., 1·0153; acid, ·51; alcohol, 3·75.

Experiment 13.—To determine what changes would take place in the bottled cider without the use of any preservatives or the application of heat, three bottles were filled at the same time as all these experiments were started and immediately fastened up as usual. These, of course, fermented, and at the end of the eleven months were found to be nicely up and to have a little more sediment than some of the bottles containing preservatives. But they were of excellent flavour. Analysis proved that they had the following composition on 2nd November, 1898: sp. gr., 1·0155; acid, ·43; alcohol, 3·75.

It will thus be seen that fermentation had not proceeded very far, only, in fact, sufficient to produce a good sparkle in the cider.

The results of these experiments are evident. Not one of the ordinary preservatives, when added to cider in cask, appears to have any effect in checking the progress of fermentation. The same may be said of cider in bottle, provided that it be not first filtered. Formalin, which is the only exception, proved useless, owing to the peculiar precipitating action it has upon the colouring matter and other constituents of the cider. With filtered cider, provided that it be properly filtered, there appears to be no need for the use of preservatives, for if the amount of fermentation during an exceptionally hot summer like 1898 is so small as that shown by Experiment No. 13, it is evident there can be no object in adding preservatives to cider. In fact, the use of such preservatives is detrimental to the cider. What the changes are which take place in the juice during this period of keeping I cannot at present state, but one result is evident, and explains why it is that cider—and probably every other fermented liquid—mellows and becomes soft with age. This slow fermentation of ripening causes a diminution of acidity. That such a change took place had been noticed in past years, but never has the proof of this change being due to fermentation been so strongly demonstrated as by these experiments. For instance, the cider used in Experiments 8 to 13 when bottled contained $\cdot 68$ per cent. acid. At the end of eleven months the cider containing formalin, in which fermentation had been stopped, showed $\cdot 65$ per cent. acid. Those containing sodium salicylate show $\cdot 63$ per cent. and 60 per cent. respectively. In the cider containing borax the acidity had been reduced to $\cdot 58$ per cent., in that which was pasteurised and to which yeast had been added the acidity was 51 per cent., and in the samples kept as a check, and in which most fermentation had taken place, the acidity was reduced to $\cdot 43$ per cent.

This reduction of the acid materially softens the cider, and it probably does more than this. What becomes of the acid? My impression is that, in some way or other, though how I am not yet certain, it goes to produce those flavouring substances which are present in well-matured cider, and which are certainly not present in the juice when it is bottled. There is further evidence to prove this, for whenever a sample of cider is of inferior quality, no matter from what cause, the acid in it instead of having diminished has invariably increased.

These experiments prove that farmers must trust to cleanliness of make, and to care in the manipulation of the juice, and not to preservatives, if they wish to produce the best cider. By so doing they will produce an article that will hold its own in the market, and will successfully compete with the cider now being imported, most of which contains preservatives.

APPENDIX.

COMPOSITION OF THE JUICE OF VARIOUS APPLES, 1898.

Name of Apple.	No.	Grower.	District.	Average Weight of tags of Apples.	Percent- tage of Juice.	Sp. Gr.	Total Solids.	Acid.	Grape Sugar.	Cane Sugar.	Tannin.	Extrac- tives Ash, &c.
Butleigh No. 14	174	R. Neville Grenville	Butleigh	1.3	50	1.0933	23.22	.40	18.18	2.22	.380	2.040
Royal Jersey	175	D. J. Crofts	Sutt'n Montis S.	3.1	69	1.0692	17.46	.27	14.92	1.47	.406	.304
Chisel Jersey	176	Do.	Do.	1.8	72	1.0682	17.06	.31	14.08	1.79	.370	.510
Cadbury	177	Do.	Do.	4.0	72	1.0703	17.54	.42	15.87	1.08	.354	..
Corton Pippin	178	Do.	Do.	3.9	58	1.0593	14.84	.32	12.82	.33	.214	1.156
White Close Pippin	179	Do.	Do.	3.9	60	1.0588	14.86	.35	11.36	1.79	.270	1.090
Red Streak	180	Do.	Do.	2.4	64	1.0672	16.80	.41	14.28	.64	.476	.894
Captain Liberty	181	Do.	Do.	2.0	76	1.0628	15.26	.93	11.36	2.33	.304	.836
Horner	182	Do.	Do.	1.2	68	1.0573	14.38	.36	10.20	2.62	.226	.974
White Jersey	183	Do.	Do.	2.0	65	1.0603	14.86	.25	11.11	2.22	.190	1.090
Green Jersey	184	Do.	Do.	1.5	56	1.0608	15.16	.42	13.88	.40	.334	.126
Unknown, No. 1	185	Do.	Do.	1.7	58	1.0663	16.58	.41	14.28	.87	.252	.768
Blenheim Orange	186	Rout and Son	Norfolk	1.8	42	1.0612	14.40	.78	11.62	1.53	.120	.350
Crow's Egg	187	Do.	Do.	2.7	56	1.0491	11.40	.45	9.43	1.43	.084	.006
Dr. Harvey	188	Do.	Do.	2.0	51	1.0581	13.76	.55	10.63	.78	.066	..
King Pippin	189	Do.	Do.	1.4	43	1.0601	14.14	.57	11.62	.57	.094	1.286
Kingston Black	190	J. O. Waterman	Baltonaboro' S.	1.8	53	1.0691	16.90	.57	10.84	4.81	.182	.998
London Pippin	191	Rout and Son	Norfolk	1.8	40	1.0591	14.08	.62	10.41	1.49	.068	1.492
Morton's Bitter	192	R. Neville Grenville	Butleigh	1.9	51	1.0781	18.16	.37	13.88	3.86	.410	.140
Red Jersey	193	J. O. Waterman	Baltonaboro' S.	1.5	58	1.0611	14.98	.31	12.04	1.85	.314	.446
Bussets	194	Rout and Son	Norfolk	1.5	51	1.0631	15.00	.70	11.80	1.14	.120	1.560

Jamsurav	195	Do.	..	Do.	..	W.	3-0	58	1-0541	12-70	.92	8-62	3-00	.074	.086
Redstreak	199	Do.	..	Do.	..	W.	4-0	33	1-0491	10-96	.55	8-06	2-57	.046	..
Scotch Bridgets	200	Do.	..	Do.	..	W.	.7	64	1-0501	11-96	.39	8-77	2-59	.146	.064
White Norman	201	Do.	..	Do.	..	W.	1-6	61	1-0481	11-98	.33	8-08	3-03	.188	.352
Brown Thorn	202	Do.	..	Do.	..	Butleigh	1-5	52	1-0632	15-56	.27	12-50	1-38	.264	1-146
Gins	203	J. F. Millard	..	Do.	..	Kent	2-1	50	1-0711	17-36	.59	12-50	3-12	.436	.714
Jerseys	204	Swanley Cider Co.	..	Do.	..	Do.	2-2	49	1-0581	13-92	.80	10-64	2-18	.230	.070
Kent Goffs	205	Do.	..	Do.	..	Butleigh	1-8	50	1-0642	15-68	.31	12-50	2-20	.232	.438
New Cadbury	206	J. F. Millard	..	Tenbury	W.	2-3	56	1-0641	15-32	.90	11-63	2-65	.194
Red Soldier	207	H. Hardeman	..	Butleigh	S.	1-5	49	1-0661	16-46	.40	11-63	2-65	.274	1-506	
Turner's Apple	208	R. Neville Grenville	..	Kent	..	2-7	55	1-0561	13-64	.39	11-36	.83	.100	.960	
White Fruit	209	Swanley Cider Co.	..	Baltonsboro' S.	..	3-2	33	1-0572	13-03	.75	10-20	1-42	.086	.574	
White Jersey	210	J. C. Waterman	..	Butleigh	S.	2-4	35	1-0674	15-66	.58	10-64	3-24	.078	1-122	
Winter Queening	211	Swanley Cider Co.	..	Marlock	S.	3-4	53	1-0612	14-62	.32	10-64	2-51	.302	.848	
Blenheim Orange	212	R. Neville Grenville	..	Do.	S.	2-0	65	1-0542	13-46	.32	9-80	2-39	.244	.706	
Broad Leaf	213	J. H. Synes	..	Butleigh	S.	3-6	58	1-0702	17-04	.77	10-41	4-74	.140	.980	
Chisel Jersey	214	Do.	..	Sutt'n Montis S.	..	1-8	53	1-0582	14-28	.20	10-41	2-09	.182	1-398	
Lady's Favourite	215	A. Witcombe	..	Butleigh	S.	1-1	60	1-0672	16-78	.27	11-62	3-53	.216	1-144	
Late Hanger	216	D. J. Crofts	..	Do.	S.	1-5	51	1-0612	15-10	.25	11-11	3-17	.144	.426	
Merricks	217	R. Neville Grenville	..	Do.	S.	2-0	48	1-0693	17-40	.30	11-62	2-26	.186	3-034	
llard's Longstem	218	J. F. Millard	..	Sutt'n Montis S.	..	3-4	50	1-0593	14-62	.47	9-80	4-08	.264	.006	
llard's Unknown	219	Do.
reak Apple	220	D. J. Crofts

S. Somerset.

W. Worcestershire.

W. Worcestershire.

S. Somerset

XIII.—*Annual Report of the Society's Consulting Chemist*
(DR. J. A. VOELCKER, M.A., F.I.C., &c.).

I AM happy to report that a larger number of samples was sent for analysis, under the Society's privileges, during 1898 than in the preceding year. The total was thirty-six as against sixteen in 1897.

The larger proportion of these were samples of water, twenty such in all being sent me, and the results of my examination showed, in the majority of cases, the necessity for inquiry into the nature of the water supplies in question.

Of the twenty samples no less than thirteen were found to be badly polluted, three were of a doubtful character, and, at best, inconveniently hard and unserviceable, while only four supplies were reported upon as being fully satisfactory. In one case, where a hard water supply had been ostensibly subjected to a softening process, this proved to have been quite ineffective.

Five samples of soil—the majority for complete analysis—were examined, and advice given thereupon.

Three samples only of feeding materials were reported upon, and these were in each case compound or feeding cakes. Not a single sample of either linseed or cotton-cake was submitted, which is rather remarkable after the warning note conveyed in my last Annual Report to the Society.

The samples of manurial substances submitted were limited to five, and each of these was of basic slag. Basic slag, according to its source of origin, may vary considerably in quality, while its "fineness" will also vary with the extent of the grinding employed. It is now generally recognised that basic slag of good quality will contain from 38 to 45 per cent. of phosphates, and be of 80 to 90 per cent. "fineness." There would appear, however, to be some difficulty in the West of England in getting basic slag of high quality. At all events, the five samples submitted for analysis gave only the following

	1	2	3	4	5
	per cent.	per cent.	per cent.	per cent.	per cent.
phosphoric acid	15·35	15·93	13·11	16·41	15·96
lime, as carbonate	33·51	34·77	28·62	35·82	34·84

In the case of No. 4 the "fineness" was only 75·5 per cent.; in the others it was 80 per cent. or higher.

Of miscellaneous materials there were sent for analysis one sample of white lead paint, one of sulphate of copper, and one of a material sold as "vitriol for wheat-dressing." The white lead paint contained 1.09 per cent. of sulphate of baryta, for which there was no occasion. The sulphate of copper was genuine, but the "vitriol for wheat-dressing," though made up to look like sulphate of copper ("blue-stone" or "blue vitriol"), and the purchaser believing it to be and buying it as such, was found in reality to be nothing but the far cheaper and ineffectual material, sulphate of iron ("green vitriol"), coloured with Prussian blue, so as to make it look like sulphate of copper. This fraud has, through the activity of a member of the Council of this Society, been now exposed; but, from other similar cases of misrepresentation brought to my notice, there is reason to believe that there has for some time past been a great deal of fraud practised upon the farmer in this respect. If, however, farmers do not make use of the facilities in regard to chemical examination which are so readily placed at their disposal by the Council of this and other agricultural societies, it can hardly be wondered at that they will from time to time be imposed upon.

The following is the list of samples analysed for Members during 1898:—

Waters	20
Soils	5
Feeding Cakes	3
Basic Slag	5
White Paint	1
Sulphate of Copper	1
Vitriol for Wheat-dressing	1
Total	<u>36</u>

XIV.—*The Society's Exhibition at Cardiff.* By THOS. F. FLOWMAN, Secretary and Editor.

THE Society's 1898 Exhibition at Cardiff was opened on Wednesday, May 25, and closed on Whit Monday, May 30.

A plan showing the situation and arrangement of the Yard will be found facing the title-page of this volume.

ANNUAL MEETING OF MEMBERS.

At the Annual General Meeting of Members, held on the third day of the Show, in the Council Pavilion, the following Report of the Council was received and adopted:—

The Council, in presenting their Annual Report, congratulate the Members upon meeting once more in the Principality, where the Society has always been heartily welcomed, and where its exhibitions have been unusually successful.

The progress of the Society since its last visit to Cardiff in 1882 is shown by the growth of its membership, the larger dimensions of its exhibition, and the wider scope of its operations.

The total number of Governors and Members standing in the Society's books at the beginning of the current year was 1232, as against 873 in 1882.

The Council regret that death has deprived the Society of two of its Vice-Presidents, viz. :—Lord Carlingford (who was President in 1886), and Mr. R. Benyon (who was President in 1875).

In 1882 the entries of agricultural stock and produce numbered 1,196; in 1898 they are 1,562. Then 17,236 feet of ground sufficed for the implements and machinery exhibited; to-day they occupy 21,722 feet.

In 1882 there was neither a dairy nor any dairy produce in the Show Yard, nor were butter-making or milking competitions included in the prize schedule; now these are prominent and important features, exciting much interest.

The money prizes, which in 1882 amounted to 2,615*l.*, have since been increased to 3,092*l.*, whilst there is, in addition, a large number of prizes, in the shape of medals and plate, which found no place in the schedule of 1882.

The Society's sphere of work, apart from the Show, has been similarly enlarged, especially in the direction of practical education and scientific research.

During the past year the Council have continued their efforts for the promotion of Technical Education in Agriculture by organising and conducting, on behalf of the Somerset County Council, a Cheese and a Farriery School, which are being continued during the current year. The Council are glad to be able to state that those for whom the instruction was primarily intended have not failed to take advantage of it, as has been shown by the attendance of pupils.

The Council are also following up the practical and scientific investigations initiated by the Society a few years since, in connection with Cheese-making and Cider-making, the experience of previous years having fully satisfied them of the value of these researches. Particulars of the results obtained have been published in the recent issue of the Society's Annual 'Journal.'

The experiments upon the improvement of grass land, which were

on foot in 1895, are in progress, and attention is especially being directed to the cause and effect of "teariness" in land.

The Board of Agriculture has once more borne testimony to the utility of the experimental and research work of the Society by awarding a grant of 300*l.* in aid of it.

The Council have gratefully to acknowledge the receipt of special prizes from the Cardiff Local Committee, the Shire Horse Society,

Hunters' Improvement Society, the English Jersey Cattle Society, the English Guernsey Cattle Society, the Kerry and Dexter Cattle Society, the Shorthorn Dairy Prize Fund Committee, His Grace the Duke of Marlborough, Captain Best, R.N., Sir James Smith, Bart., Sir Walter Gilbey, Bart., Mr. W. B. Tegetmeier, and Mr. A. E. Morgan.

The Council have accepted an invitation to hold the Annual Meeting in 1899 at Exeter.

The Council have much pleasure in recommending that the Right Hon. the Lord Clinton be elected President for the ensuing year; that Mr. Henry P. Jones and Captain John C. Best, R.N., be elected Vice-Presidents of the Society; and that the gentlemen named on

Agenda Paper be elected Members of Council for the years 1898-1900 in room of those retiring by rotation.

The Council desire to express their thanks to the inhabitants of the town and neighbourhood of Cardiff, and especially to the members of the Local Committee, for the cordiality with which they have welcomed the Society, and the energy they have displayed in promoting the success of the Meeting.

In conclusion, the Council would earnestly impress upon every member of the Society the desirability of making an effort to increase the roll of membership, by bringing under the notice of members, especially those interested in the land, the advantages the Society offers. The increasing demand upon its funds, resulting from the additional work which, in the direction of experiment and research, it has in recent years taken upon itself, renders it more than ever necessary that its income should be fully maintained. But, beyond this, an increasing membership affords substantial evidence of vitality which is in itself a source of influence and strength.

Resolutions were passed adopting the recommendations contained in the Report with reference to the appointment of officers; and special votes of thanks were accorded to the Local Committee, the Judges, the Railway Companies, and the retiring President.

ENTRIES.

The following is a comparative statement of the entries in various classes in 1882 (when the Society previously visited Cardiff), 1897, and 1898 :—

	Cardiff, 1882.	Southampton, 1897.	Cardiff, 1898.
HORSES:—			
Agricultural	28	59	68
Hunters, Hacks, Ponies, and Harness ..	129	64	124
	— 157	— 123	— 192
CATTLE:—			
Devons	23	55	42
Shorthorns	78	48	55
Herefords	58	30	45
Sussex	24	28	22
Jersey	36	178	99
Guernsey	29	88	66
Black Welsh	36	..	18
Aberdeen Angus .. .. .	..	7	8
Kerry and Dexter .. .. .	..	39	25
Dairy	7	..	2
Butter and Milk Tests .. .. .	..	32	31
	— 291	— 505	— 413
SHEEP	171	205	151
PIGS	98	109	101
POULTRY	479	397	440
FARM PRODUCE:—			
Cheese .. .. .	..	146	97
Butter and Cream .. .. .	..	179	124
Cider .. .. .	..	44	44
	..	— 369	— 265
Total	1,196	1,708	1,562

A list of the Awards, names of the Judges, &c., will be found on pages i.—lxiii. of the Appendix to this volume.

CIDER.

A separate Report dealing with this section of the Exhibition will be found on pages 190–202.

PRIZES.

The following table shows how the money prizes were apportioned at the 1882, 1897, and 1898 Exhibitions:—

	Cardiff, 1882.			Southampton, 1897.			Cardiff, 1898.		
	£	s.	d.	£	s.	d.	£	s.	d.
Cattle	1,187	0	0	1,238	10	0	1,278	10	0
Sheep	518	0	0	478	0	0	415	0	0
Pigs	160	0	0	260	0	0	200	0	0
Poultry	190	0	0	159	10	0	170	11	0
Dairy .. .. .	..	..	..	294	5	0	226	15	0
Sheep	6	6	0	40	0	0	22	0	0
Sheep .. .. .	..	..	..	20	0	0	..	..	..
Total	2,615	6	0	3,030	5	0	3,092	16	0

The Money Prizes in 1898 were contributed as follows:—

	£	s.	d.
By the Bath and West and Southern Counties Society	2,829	5	0
„ Cardiff Local Committee	200	0	0
„ English Jersey Cattle Society	30	0	0
„ Kerry and Dexter Cattle Society	10	10	0
„ Captain J. C. Best, R.N.	10	0	0
„ Shortborn Dairy Prize Fund Committee	10	0	0
„ English Guernsey Cattle Society	2	0	0
„ Mr. A. E. Morgan	1	1	0
	3,092	16	0

Gold, Silver, and Bronze Medals were also given by the Society, and Medals or Plate by the Shire Horse Society, the Hunters' Improvement Society, Sir James Blyth, Bart., the Duke of Marlborough, English Jersey Cattle Society, English Guernsey Cattle Society, Sir Walter Gilbey, Bart., and Mr. W. B. Tegetmeier. (Particulars of these Prizes will be found in the list of Awards on pages iii.-lxiii. of the Appendix to this volume.)

IMPLEMENTS.

The following is a comparative statement of the space occupied by Implements, Machinery, &c. :—

	Cardiff, 1882.	Southampton, 1897.	Cardiff, 1898.
Machinery in Motion feet run	812	1,064	1,120
Agricultural Implements	3,745	3,645	3,625
Seeds, Cattle Foods, &c.	727	791	875
Miscellaneous Articles	1,377	675	1,010
Greenhouses, &c. sq. feet	10,575	15,710	15,092
Total	17,236	21,885	21,722

MISCELLANEOUS DEPARTMENTS.

A fully equipped Working Dairy formed as usual a prominent feature of the Show. The Butter-making Competitions were held in it, and butter-making demonstrations were given daily.

There were also Shoeing and Milking Competitions, which attracted many spectators.

The Exhibitions of Pictures, Art Manufactures, and Plants and Flowers were fully up to the average of previous years, and

there was no diminution of interest in them on the part of the public. The customary Art Union was held, and a list of the prize winners and of the pictures chosen will be found on pages lxiv., lrv. of the Appendix to this volume.

Musical performances were given by the Bands of the Coldstream Guards and the Royal Marines (Plymouth Division).

The usual Sunday Service, at which there was a large attendance of herdsmen and others engaged in the Yard, was held in the Working Dairy. It was conducted by the Rev. Canon Thomson, D.D., the Sermon being preached by the Bishop of Llandaff.

ATTENDANCE.

The total number of persons paying for admission was 55,602, as against 42,034 at Southampton in the previous year.

A comparative statement of attendances since 1852 will be found on pages lxxvii.—lxxviii. of the Appendix to this volume.

XV.—*The Milk and Butter Test Cattle Classes at the Cardiff Exhibition.* By Dr. J. A. VOELCKER, M.A., F.C.S., Mr. ERNEST MATHEWS, and Mr. JULIAN STEPHENS.

At the Society's Exhibition, held last year at Cardiff, there were five classes for dairy cattle, to be judged by either a milk or a butter test.

MILK TEST CLASSES.

With respect to these classes, the Society's Consulting Chemist (Dr. Voelcker) reported as follows:—

"Two classes, 103 and 104, were allotted to cows competing for the production of the largest quantity of milk of good quality. With a view to encouraging a high standard of quality and discouraging heavy yields of watery milk, it was decided by the Council that the milk of the cows qualifying for the prizes should contain at least 12·25 per cent. of 'total solids,' of which not less than 3·25 per cent. should be 'fat.'

"The competing animals were divided into two classes, according as their live weights, taken in the Yard by the Stewards, were found to be above or below 900 lbs. In each class three prizes, viz. of 10*l.*, 3*l.*, and 2*l.*, were offered.

Class 103, for cows under 900 lbs. live weight, attracted no entries, but in Class 104, for cows of 900 lbs. live weight or

No.	Owner and Cow.	Breed.	Age.	Quantity of Milk.			Quality of Milk.				Award.
				Thursday morning.	Thursday evening.	Total.	Thursday morning.		Thursday evening.		
							Fat.	Solids.	Fat.	Solids.	
444	(Mr. J. D. T. Parson, jun.) "Fan 11th"	Guernsey	6½	lbs. ozs. 22 3	lbs. ozs. 19 7	lbs. ozs. 41 10	Per cent. 4.2	Per cent. 13.0	Per cent. 5.4	Per cent. 14.07	1st Prize, 10l.
501	Mr. L. de Rothschild ..	Shorthorn		31 2	28 4	59 6	1.9	10.45	3.0	11.38	Deficient in quality.
502	Mr. T. James "Dairy "	{Shorthorn cross	4	19 3	17 4	36 7	3.15	12.83	4.15	13.04	3rd Prize, 2l.
503	Mr. T. James "Childley"	Shorthorn	5	20 6	19 8	39 14	2.81	11.82	4.05	12.70	2nd Prize, 3l.

over, there were five entries, four of which actually competed. Of these, one was a Guernsey cow, the other three being Short-horn, or Shorthorn cross.

"The test milkings were taken on Thursday morning and Thursday evening, May 26th, the competing cows having been milked dry, in the presence of the Stewards, on the previous Wednesday evening. Samples of the milk were on each occasion taken by myself for analysis. The table on page 223 gives the particulars of the yields, analyses, and awards.

"One cow, No. 501, it will be seen, gave milk on each occasion deficient in quality. The first prize winner, Mr. Parson's Guernsey, gave much the best return, the quality being on each occasion well above the requirements, whilst the other two cows only reached the standard when taking the average of the two milkings.

"J. AUGUSTUS VOELCKER."

BUTTER TEST CLASSES.

The English Jersey Cattle Society offered prizes for cows of any breed or cross, obtaining the greatest number of points by the practical test of the separator and churn, judged by the scale of points adopted by that Society.

There were two classes, one for animals under 900 lbs. live weight, and the other for animals of 900 lbs. and over live weight.

The prizes in each class were, first, 10*l.*; second, 3*l.*; third, 2*l.* Gold, silver, and bronze medals were also offered for the three Jersey cows, entered or eligible for entry in the English Jersey Herd Book, obtaining the greatest number of points in the test.

The Judge (Mr. Ernest Mathews) reported as follows:—

"Only nine animals (viz. eight Jerseys and one Guernsey) out of an entry of fifteen presented themselves for competition for the special open prizes and medals offered by the English Jersey Cattle Society.

"The cattle were weighed at 7.30 A.M. on Wednesday, May 25th, and milked out at 5.20 the same evening—Thursday's milk being taken for the test.

"Six animals scaled under 900 lbs. live weight. The milk was separated through an Alpha-Baby machine. Churning commenced at 7.30 on Friday morning, and the awards were published by 11.30. The awards were as follows:—

"Class 107, under 900 lbs. live weight:—

	Points.
Dr. H. Watney's Marryatt's Lass, first prize with	44·15
Mr. W. McKenzie Bradley's Gauntlet, second prize with	43·85
Dr. H. Watney's Sherbet 2nd, third prize with	42·20

“Class 108, above 900 lbs. live weight:—

Dr. H. Watney's Sheila of Ruthven, first prize with	Points. 44·20
Dr. H. Watney's Sherbet, second prize with	35·75

“The gold, silver, and bronze medals were awarded to Dr. H. Watney's Sheila of Ruthven, Dr. H. Watney's Marryatt's Lass, and Mr. W. McKenzie's Bradley's Gauntlet, and certificates of merit to Dr. Watney's Queen Bess of Ruthven and Mrs. McIntosh's Zenobia 4th.

“The following table gives the average of the prize-winners and of the eight Jerseys tested:—

—	Days in Milk.	Milk.	Butter.	Butter Ratio.	Points.
		lbs. oz.	lbs. oz.		
7 Prize-winners averaged ..	104	39 14	2 2½	18·35	40·67
8 Jerseys averaged	94	37 8½	2 0½	18·44	37·81

“The arrangements made by the Bath and West and Southern Counties Society were, as usual, everything that could be desired, and my special thanks are due to Mr. E. H. Llewellyn, M.P., the Steward, and to the Misses Benjafield and Jenkins, who assisted in the superintendence of the dairy work.

“The separator, Delaitouse, churns, &c., were provided by the Dairy Supply Company.

“One curious and inexplicable case of churning calls for remark.

“No. 444, a Guernsey cow, yielded a good lot of rich milk. The separated cream appeared all right. It was cooled to 52°, and was put into the churn at that temperature, the churn having been previously cooled to 48°. The butter came in twenty-five minutes, and the temperature of the buttermilk stood at 52°.

“The buttermilk was kept till the completion of the churning of the other cream, when, as it appeared still to have a lot of cream, it was passed through the separator at a temperature of 90°, and the cream which was obtained was cooled down to 52° and churned, with the result that 6 oz. more butter were obtained. The buttermilk, which stood at 53°, was still kept, and although it did not appear to Mr. Stephens, the Judge of the Guernsey butter test, nor to me, to have any cream worth consideration left, yet it was not so devoid of cream as all the other samples were.

“Apparently the cow was in good health, and I could not find that she had been fed on any very special food. I can

CLASS 107.—COWS OF ANY BREED OR CROSS, UNDER 900 LBS. LIVE WEIGHT.

CHURNING TABLE.																						
No. in Catalogue.	Name of Cow.	Breed.	Exhibitor.	Live Weight.	Date of Birth.	Date of last Calf.	Days in Milk.	Milk Yield.	Butter Yield.	Ratio—lb. Milk to lb. Butter.	Colour and Quality of Butter.	No. of Points for Butter.	No. of Points for Lactation.	Total No. of Points.	Awards.	Temperature.						
																Time.			Temperature of Dairy.		Buttermilk when Churning finished.	Cream and Churn.
																Churning begun.	Churning finished.	Duration of Churning.	deg.	deg.	deg.	
																						a.m.	a.m.	min.
516	{Marryatt's Las-(2998) F.S. }	Jersey	Dr. H. Watney	lbs. 753	Nov. 5, '93	Feb. 2, '98	114	40	4 2-44	17-52	Good	38-75	7-40	44-15	{1st, 10l. and silver medal }	7 40	8 38	58	53	52		
537	Gauntlet, lx.	"	{W. McKenzie Bradley .. }	864	1893	Nov. 15, '97	193	32	0 1 15	16-34	Bad, fair	31-25	12-00	43-25	{2nd, 3l. and bronze medal }	9 48	10 15	27	53	55		
514	Sherbet 2nd, vl. 548	"	Dr. H. Watney	766	Dec. 5, '94	Dec. 25, '97	153	28	9 1 15	14-50	Good	31-50	11-30	42-80	3rd, 2l.	9 2	9 30	28	56	52		
511	{Queen Bess of Ruth- ven, vl. 228 }	"	Dr. H. Watney	737	Feb. 17, '93	Mar. 12, '98	76	41	5 1 15	20-99	Good	31-50	3-60	35-10	Certificate of merit	9 30	10 30	60	53	52		
506	Zenobia 34th, vl. 437	"	Mrs. McIntosh	777	Sep. 25, '91	Apr. 5, '98	52	41	11 2 0	20-52	Good	32-50	1-20	33-70	Certificate of merit	9 37	10 10	83	53	54		
370	Marchande	"	W. B. Roderick	727	1894	May 9, '98	18	21	14 19	04	Fair	17-75	..	17-75	..	9 41	10 12	31	53	54		

CLASS 108.—COWS OF ANY BREED OR CROSS, 900 LBS. LIVE WEIGHT OR OVER.

512	(Shella of Ruthven, vl. 548)	"	Dr. H. Watney	986	July 16, '90	Apr. 10, '98	47	55	12 2	11 1	20-50	Excellent	43-50	0-70	44-20	(1st, 10L and gold) medal	9 17	9 53	36	57	52
518	Sherbet, vl. 548	"	Dr. H. Watney	932	Nov. 22, '90	Feb. 18, '98	98	39	9 2	34	21-14	Good	35-75	5-80	41-55	2nd, 3L	8 23	9 36	73	54	54
444	Fan 11th	Guernsey	(J. D. T. Parsons, Jou.)	1092	6y. 4m. 6d.	Apr. 29, '98	28	41	10 1	15 1	21-14	Excellent	31-50	..	31-50	..	..	..	..	..	..

PARTICULARS OF COWS TESTED, YIELDS OF MILK AND BUTTER, AWARDS, &c.														CHURNING.—TIME AND TEMPERATURE.			
No. in Catalogue.	Exhibitor.	Name of Cow.	Breed.	Live Weight.		Age.	Date of last Calf.	No. of Days in Milk.	Milk Yield in 24 Hours.	Butter Yield.	Ratio, viz. : lbs. Milk to lbs. Butter.	Colour and Quality of Butter.	AWARDS.	Time.		Temperature.	
				lbs.	ys. ms. ds.									min.	deg.	deg.	deg.
444	J. D. T. Parsons, jun.	Fai 11th	Guernsey	992	6 4 6	April 29.	23	41 10	1 15½	21 14	Excellent.	1st Prize.	7.30	7.55	53	52	
443	Sir F. Montefiore	Flora	"	954	6 3 0	April 19.	38	34 7 1	7½	23 44	"	2nd Prize.	7.36	8.47	53	54	
439	E. A. Hambro	Richesse du Chene 2nd	"	1168	8 2 6	May 1.	26	32 2 1	4½	25-38	"	3rd Prize.	7.31	8.16	53	52	
445	J. D. T. Parsons, jun.	Claremont Mabel	"	945	6 6 1	Jan. 4.	143	14 14	0 11½	20-25	(Good.	"	7.28	8.45	53	53	

therefore only conclude that here is an instance of non-churnability in cream."

The results are shown in a tabulated form on page 226.

The English Guernsey Cattle Society offered prizes for cows or heifers, entered in the English Guernsey Cattle Society's Herd Book, yielding the largest quantity of butter by the practical test of the separator and churn. The prizes were as follows:—First, silver cup, value 5*l.*; second, silver medal and 1*l.*; third, bronze medal and 1*l.*

The Judge (Mr. Julian Stephens) reported as follows:—

"The entries numbered five, and of these four only competed. This trial was conducted under the same rules as have been in force previously, and no allowance was made for period of lactation. The total yield of butter, therefore, was the sole consideration.

"The yields were poor. The weather was cold and wet, and not favourable, and it was stated by the men in charge that the milk showed a considerable reduction upon the quantity that the animals had been giving. It is worthy of remark that, in the case of the first prize-winner, the buttermilk was observed to be throwing up a quantity of fat, and it was separated and churned a second time—6 oz. of butter being obtained from it. It would be interesting to investigate the cause of this."

The results are shown in a tabulated form on page 227.

The Note-Book.

The Duck Industry.—Mr. Edward Brown, F.L.S., contributes a paper to the 'Live Stock Journal Almanac,' from which we extract the following practical lessons:—

Though probably the greatest number of ducklings are still bred in Bucks. and Beds., this is an industry which is spreading rapidly. The practical monopoly of the two counties named above is passing away from them, for the old notion that there is some special virtue in the soil or gravel in the Vale of Aylesbury is exploded. Nature is not so chary of her gifts, and similar conditions can be met with elsewhere.

Within the last few years there has been a considerable development of duck-rearing in various parts of the country.

In the duck districts the breeding stock are generally kept by farmers who do not undertake the work of hatching and rearing, and we do not see any reason why the plan should not be continued, as it affords an opportunity for those who have only a small area of land to carry on the industry.

Where operations are conducted upon a larger scale, as on a farm, there is no reason why the entire process should not be carried out. To do so it is necessary to keep a good flock of breeding ducks, which should have as much liberty as possible. They may be confined, so long as the space is generous and includes water. The latter is above all important, in order that the eggs shall be well fertilised, and the germs strong. To secure early eggs it is essential to have a comfortable house, and for the first batches we must look to young ducks, bred about February or early in March, the older specimens not coming into profit until after Christmas.

Artificial methods of hatching have not been adopted to any extent in the Vale of Aylesbury and the surrounding district, hens being almost exclusively employed for this work. We all know how difficult it is to obtain broody hens in winter, and how uncertain even those which are broody may be at that season. Hence the high prices paid for sitters. The best prices for ducklings are obtainable from February to June, and we must allow three months from the time of eggs being laid to

the ducklings arriving at a killing age. Thus it will at once be evident that if we wait for hens, much of the trade will be over, and we shall begin to sell when prices are on the "down grade," perhaps only when they are almost at their lowest point. At one time it was a common impression that whilst incubators might be valuable for the hatching of chickens, they were not successful with duck eggs. There are duckers who still believe in this legend. The experience of many breeders has shown that artificial incubation is successful with duck eggs, and that its introduction enormously increases the power of the breeder, enabling him to better regulate his output, and prevent that crowding into a comparatively few weeks which is frequently met with under the older methods. He is, moreover, less dependent upon the weather, and the cost of machines is more than compensated by the avoidance of any necessity to purchase sitting hens, for which high prices have frequently to be given.

So far as the rearing is concerned, it is a great advantage in this climate that, except during very severe weather, ducklings require no brooding, or artificial heat, after the first two or three days. During the first few days, until the ducklings are fully upon their legs, they must be kept warm, either in a room with a fire or in a brooder, but the heat must not be great, or they will die off when put in the ordinary house, and 75° to 80° Fahr. will be quite high enough. If the weather is very severe it may be well to continue this heat a few days longer, but in ordinary seasons a couple of days will be quite long enough, and then they may be put in a house with a frame on which is nailed flannel under canvas, or felting.

For rearing, various methods may be employed, the principle, however, of all being the same. We sometimes find large buildings, such as old barns or sheds, used, in which the ducklings are divided off into batches of twenty-five to fifty, by means of boards 15 to 18 in. high, and I have seen as many as a couple of thousand in one place at the same time. Three times a day the boards are removed and the ducklings allowed into an open yard for feeding. During their absence the litter, usually straw, is shaken up or renewed as required. Another plan is to have small houses about 3 ft. square, with a run made by means of wire netting in front. The ducklings are kept in the houses—which must always be well ventilated—all day except during feeding time. A third plan is to have a long piece of shedding, say 45 ft. long by 10 ft. wide, and divide this by means of boards into nine compartments, the first 3 ft. wide by the full depth, and the last 7 ft. by 10 ft. Such a house should be 7 ft. high in front, sloping to 5 ft. 6 in. at the

back. To each compartment should be a door, divided in two parts like those used in stables, so that the upper half may be left open when the birds are confined inside. An open fenced yard should be provided for every two or three sections, so that the birds can be fed there. A combination of the second and third systems here mentioned is better than the single-house plan, and cheaper than building a large piece of shedding. Moreover, the various houses can be easily removed. The first house in question is 6 ft. 6 in. long by 4 ft. in depth, and divided into two sections, one 3 ft. by 4 ft., and the other 3 ft. 6 in. by 4 ft. Five houses are required, of which the above will be No. 1. The second will be 7 ft. 6 in. by 4 ft., and so on, each compartment increasing 6 in. in length. Thus the fourth will be 9 ft. 6 in. by 4 ft., or, better still, 5 ft., divided into 4 ft. 6 in. and 5 ft. respectively. The fifth house should be 6 ft. by 4 or 5 ft., and in one compartment. To each house is an open run, enclosed by netting.

The idea is to provide more space in the houses as the birds increase in size, otherwise they would have to be reduced in number. During the first week after they are removed from the warm room they are kept in the first pen, and removed seven days later to the second, when their place is taken by a further batch, and so on, advancing them a stage every week. By the time they are a few days in the last house they will be nine weeks old, and should be ready for killing. This plan enables the duck-rearing to be under perfect control, and the feeding arrangements are much simplified. If the large 45 ft. long shed were used the same plan of moving up would be adopted.

I have not attempted to go into details as to the feeding of ducklings, as they can be obtained elsewhere. In poultry-keeping we require to enlarge our ideas, by laying down true principles and extending their application beyond the small operations which are frequently met with. That duck-raising on a fairly large scale is profitable cannot be doubted. Perhaps the increase of output during the spring months may result in reduction of prices for early ducklings, but there is plenty of margin to work upon, and we should find the demand, already considerable, advancing by leaps and bounds.

Sterilised Milk.—It was high time that some facts concerning sterilised milk should become known to the public, and these have been admirably set forth in a paper by Miss M. M. Macqueen in the 'Mark Lane Express Almanac.' Milk is exposed in many cases to an atmosphere which teems with dust and micro-organisms. Or what is worse still, the milk may be infected with the germs of tuberculosis, and so be very

detrimental to the health of persons consuming it, who have a tendency to that disease.

Hence, writes Miss Macqueen, there has been a steadily increasing consumption of sterilised milk in different parts of the country; and where properly sterilised milk is obtainable it is much to be recommended, both for its germless condition and its convenience in handling.

But when producing sterilised milk great care is essential, for if it is not effectually sterilised greater danger is run than in the case of fresh milk, as a false sense of security is given. By sterilising we mean the destruction of all organisms and their spores. In preparing the milk it naturally follows that with fewer organisms a greater efficiency and expedition can be obtained, consequently the first requirement is to have the milk drawn from healthy cows in clean sanitary surroundings. The filtering is also of great importance, as the milk being distributed in glass bottles will show distinctly, when it has stood a few hours, whether there is any sediment or not, and thus a fault which has a good chance of escaping notice in raw milk will be emphasised in the other. The excellent system adopted in Copenhagen of passing the milk through gravel filters, deserves the compliment of being more universally imitated. But the simple expedient of passing the milk through a centrifugal separator will result in all suspended impurities being thrown out of the milk on to the sides of the separator bowl. It is necessary, however, to have another upper portion for the machine, so that the cream which separates in the bowl may be thrown again into the milk. The greatest disadvantage of this system is the amount of froth which it produces, but by allowing the milk to pass through a cloth bag in its transit from the separator to the bottling machine, the difficulty can be remedied to a certain extent.

When milk stands for a time, especially in a warm atmosphere, a considerable amount of acidity is produced, and if this acidity develops too far, the consequent result will be curdling of the milk during the process of heating, therefore, when the sterilising is not to take place at once, the milk should be cooled down to as low a temperature as possible. For these reasons it will be seen that there is a great advantage when the sterilising plant is in close proximity to the farms from whence the milk is drawn. If it has to travel far in warm weather it becomes necessary to add to the milk some preservative, and this does away at once with one qualification the milk ought to possess, viz., freedom from any adulteration. The ideal circumstances are: to have the milk direct from the cowshed, passed through the filter, bottled, and placed in the

eriliser before it has a chance to fall below 90°; this is easily possible when the steriliser is on the farm.

The principal precautions to observe in selecting machines are to see that the heat is distributed very equally through the apparatus, and that the heat can be regulated to a very fine extent. If the first precaution is neglected, some of the bottles may be insufficiently sterilised, or if the rise in temperature is too sudden breakages will occur.

In the choice of bottles attention must be paid to the facilities they offer for thorough cleansing, for rapid closing in the apparatus, and for their general convenience in handling. Before filling it is very essential that they should be properly washed and sterilised. When bottling, the milk should be allowed to rise to such a point that when the greatest expansion takes place the bottles will be full without overflowing.

The process of sterilising, to be thorough, should be done in at least two operations; many of the failures to produce a reliable article can be attributed solely to neglect of this one point. In the first heating the full grown organisms may be destroyed, but in the subsequent cooling any spore which has escaped destruction will develop, consequently a second heating is necessary to kill them. Instances have been known where milk subjected only to the first or partial process has developed very injurious properties.

The temperatures to which the milk should be raised have given rise to much discussion; the following method, however, as proved very effective. For the first operation raise the temperature slowly at the commencement, then more rapidly as the bottles get hot, until the milk reaches boiling-point. Now close them. This whole operation generally occupies from thirty to forty-five minutes. Transport them to the cooling tank, and here again the change of temperature must be warily dealt with, or cracked bottles will be the result. Authorities are pretty well agreed that a lapse of several hours should take place between the first and second heating, so as to allow time for the proper development of spores, some going so far as to say that twenty-four is advisable, others being satisfied with twelve hours. Before the second operation the bottles are rounded, thus any faulty ones can be replaced. The cream should be well shaken in and the stoppers loosened. In the second heating the milk ought to be maintained for about fifteen minutes at boiling-point. But if kept too long at that temperature a good deal of evaporation takes place, and the bottles will contain short measure. Too great stress cannot be laid upon the necessity of having a reliable thermometer, as one which registered too low would give an imperfect sterilisa-

tion, and if too high would cause the milk to become brown and acquire a burnt flavour. When all details are carefully attended to, sterilised milk may be of as good a colour, and even better flavour, than raw.

With regard to its digestibility and nutritive value, it is a well-known fact that in many cases where raw milk could not be assimilated, the sterilised article has been retained, and been of great benefit. A statement appeared not long ago in reference to an experiment conducted by a distinguished doctor, in which he estimated a reduction of 41·4 per cent. in infant mortality from diarrhoea when using sterilised milk.

Sterilised milk will keep good for considerable periods; still, if it can be avoided, it is much wiser not to stock it.

Good and Bad Points of Sheep.—In the hands of a capable and careful breeder the good points of a sheep can be increased and intensified, and thus a more valuable, as well as a more readily saleable, carcase of mutton produced. This is the key-note of an article by Mr. W. W. Chapman in the 'Mark Lane Express Almanac,' from which we extract the following notes:—

Sheep are dual producers, being maintained for the purpose of producing both meat and wool, although the better the quality of the flesh produced, the better the quality of the wool. In regard to the different breeds or varieties of sheep, all have merits and qualities that render them for particular districts the most profitable sheep to maintain. No matter the variety or breed, the good points most desirable in one are equally so in the other.

As before intimated it really is a matter that the coupler or breeder of sheep has to a great extent under his own control, whether he produces sheep with the good points in the larger proportion or the contrary. "Like produces like" is a maxim that may generally be considered true. Yet when one watches some flock-masters purchasing their rams or ewes (the progenitors of the future mutton supply), and sees how very little attention is given to their conformation and build, the conclusion inevitably forced upon one is that either these so-called breeders of sheep are utterly indifferent as to what the produce will be, or that they are ignorant of the fact that the produce of an ill-formed sheep will only be either a modification of the same (if by chance a good and truly-formed sire be used), or an animal in which the bad points are not only reproduced, but intensified by the use of a second-rate or inferior sire. Many times at both fat stock shows and summer shows one has heard the well-known remark, "a grand ram" or "ewe," or "a grand pen

of sheep," and yet how few apply to their every-day management the lessons that such exhibitions undoubtedly can, or should, convey. The general idea that at our leading shows one finds the good points of the several breeds brought out to the greatest perfection is probably a right one, for it is at these shows one sees the result of the careful work of the master breeders of the sheep industry of this country. Hence the value of these exhibitions.

The object of every breeder should be to produce sheep having the largest possible proportion of the most saleable and valuable parts of the carcase. For this purpose in selecting the sire and the dam great care is needful as well as individual examination. Haphazard mating will never succeed. The object to be aimed at is the production of a profitable carcase. The breeder should strive to raise a sheep having a wide back and loin, full chest and deep body, with well-developed legs and full outside the thigh, avoiding that kind of sheep whose body appears to have been designed with the great object of allowing the rain to run off easily and without hindrance. The former type will generally be found to be sheep having a first-class head and wide between the ears. Width at this point is most important, for it will as a rule be found that such sheep are those which have a good neck, well sprung over the heart, and wide loin; whilst, on the other hand, if narrow between the ears, there will be found little or no width either in the loin or over the heart, and the neck will be found very thin. It is therefore evident that to obtain a sheep whose conformation and build is one upon which a large proportion of meat at the most valuable points can be produced, one must first of all see that there is width between the ears.

Then it is most needful that the legs should be so placed as to stand well outside the body, having room between. This form means a wide brisket with plenty of room for proper working of the internal organism, an important factor in the well-doing of the sheep, and this form of body, too, will be found to produce sheep whose hind quarters are wide, and plenty of development of the leg, one of the most saleable portions of the carcase.

The back, too, must not only be wide but level as well. This, whilst it adds greatly to the appearance of the animal alive, and so, to some extent, enhances its market value, adds materially to the value of the carcase, because a level back, from the pit of the neck to the root of the tail, gives considerably more weight of mutton at that point of the carcase from whence come those well-known and highly-relished "chump chops." The development over the heart, which is, to a more

or less extent, found upon sheep having the above points, is of great importance, as it constitutes the portion from which mutton cutlets are cut, and the greater the spread the greater will be the room in which to place the meat. There are other points one might enumerate, but the foregoing are the more important. The value and importance thereof can be, perhaps, best realised by the actual inspection and comparison of two dead carcasses, one with the points enumerated and one without.

Avoid sheep which have their legs pinched in under them, with a long and thin neck, and narrow in the loin and over the heart. These not only do not produce the desired result in respect of meat, but they are also far more difficult to sell, from the fact that, even when fat or over-fat, their conformation and build is such that they never appear to be as good as they are.

The finest quality and most profitable meat is that which is produced upon animals whose growth has never had a check, and whose aptitude to apply the food consumed to the development of their bodies has been intensified and bred into them by careful selection. Thus animals whose build and conformation is as described above will be found to give the best and most profitable return to their breeder and grazier, inasmuch as they will all along be developing their bodies and adding weight of flesh to those parts which, dressed as mutton, realise the highest market value. If the same food is given to an ill-formed animal, it will not thrive as well nor as quickly, but waste a certain portion of food in the development of those parts of its carcass which are, at best, only of second-rate value.

The demand nowadays is for lean meat with a moderate quantity of fat. Some breeds are more prone to produce a superabundance of fat than others, hence it should be the object of breeders to endeavour by all means to counteract this undesirable proclivity. If our feeders are to compete successfully with imported mutton it can only be done by the production of meat of the finest quality and texture, with little or no waste fat. Therefore, avoid over-feeding, for it means "loss," and the object to be aimed at is "gain."

Another important point is the size of the joint or weight of carcass. The cause of the popularity and demand for imported mutton is that the joints are small. The demand of the present day is for small joints. If small joints are in the ascendant, what will be the fate of the larger breeds of British sheep? Are these to be allowed to become extinct? Certainly not, for most, if not all, of these breeds, if treated properly and pushed on from birth, will be found to be able to produce mutton of a

ize which, whilst not perhaps securing the highest price, will yet find a remunerative sale when the additional value of the fleece is taken into consideration.

Thus by inducing early maturity and breeding properly formed sheep, there is every possibility of a market for both long wools and short wools at prices which will recuperate their producers for the cost and trouble of production.

The law of supply and demand rules the market, and if the demand of the present time for small joints and lean meat continues, those breeders who produce such commodity, be they home or foreign, will be those whose produce will sell at prices that pay the cost and leave a profit.

Poor v. Rich Land.—Professor Wrightson, writing to the ‘*Agricultural Gazette*,’ stated that:—“On well-farmed land there is no reason whatever why the poor land should not produce as much as the rich land. It is all a matter of management, and if poor land is well done it will rival the good land in productive power.” This very remarkable expression of opinion brought forth from Mr. Clare Sewell Read the following practical opinions:—

I contend that good loamy land, which will carry sheep, is still worth a fair rent, while very light or very heavy soils are dear at a gift. Why is it that deep, friable loams are still kept under the plough, and the very light and very heavy lands are gone out of cultivation? Simply because the one still pays and the others do not. I distinctly state that it is not a “matter of management” but of seasons. I have farmed some useful tender soils that will grow decent crops in any season, and have had the misfortune to occupy clay land that in a wet, cold year, despite subsoiling, draining, manure, and good cultivation, would not grow half a crop, and I still farm some light land, some so light that it will blow away, but manure it as you will, so as to produce the most promising corn crops, yet on hot, dry days in July it will burn up so that all the grain will go through a Booby screen. The light land to which the Professor refers no doubt rests upon chalk, and so does my present farm, and no doubt chalk being cool is the best subsoil for light land. But if the substrata be sand or gravel, or silt, unless the top soil is deep and fairly retentive, at the present prices of corn, really light land is not worth cultivating.

If you apply any sort of manure, but especially nitrates, to very friable soils, and the crop is burnt up, the manure is all gone. In like manner, if you attempt to fertilise stiff clays with artificial manure, and do not get a plant—a frequent occurrence with roots—the most valuable constituents of that

dressing are washed into the drains by the following continuous rain, while if you apply long farmyard manure, which is so useful mechanically, it is a long time before you see any good result even from a really heavy coat of the best box manure.

Provided any sort of grass will grow upon poor light land, there is a better chance of its appropriating any dressing than if no crop is growing on it, and there is every reason to believe that it accumulates fertility. The worst feature of much of the light land of East Anglia is that the artificial seeds will not stand above one year, and the best plant will sometimes be killed by an autumn drought before it is two years old, and when the good grasses die out, creeping couch and other weeds take their place. But even these Lord Leicester utilises, for he ploughs the old sod up in the winter, and then during the spring and summer this mass of fibrous root is killed, and then ploughed under and mustard is sown (which wireworms seldom touch), and a good fold is ready for the ewes before swedes. Oats, turnips, then barley and seeds, which are kept down as sheep walk for three to six years. Some advocates of this rotation of crops suggest that dairy and rearing stock could be grafted upon it, but in East Anglia, with no water, no shade, and often no fences, what we should do with our cows and young stock in the summer I do not know, and we must stick to sheep.

I should feel inclined to qualify Professor Wrightson's praise of oats, or to recommend their extended cultivation on any light land that will grow decent barley, unless it be winter oats, for they stand drought better than those sown in the spring. With our dry soil and climate we seldom grow 10 qrs. of oats per acre, 7 or 8 being considered a very good crop, and 4 to 5 qrs. of wheat are more common. No doubt a moister climate and land with a cooler subsoil are more suitable for oats.

Surely the Professor is not serious when he says that laying down land to grass does not lower the labour bill or reduce the number of horses kept. If on a large light land farm of 1,000 acres only 40 or 50 acres lie two years in grass, perhaps not; but if half the arable land is under artificial grass, one-third of the manual and horse labour could certainly be dispensed with.

Referring to Mr. Molyneux's very excellent advice upon the cultivation of lucerne, as I have had considerable experience in its growth, I can truly recommend its extended culture. Even for hay, if it is cut before it is in bloom, it will not be so stalky as your correspondent supposes. But the chief difficulty

I have found is in obtaining a plant, and I am confident the best way to secure a full plant is to grow it with autumn wheat. Drill the wheat wide, horse-hoe in the spring, and then sow 20 lbs. of French lucerne seed—free from dodder—with a small-seed coulter drill, and roll the seed in. Barley, too often lodges, and the soft woolly straw is apt to choke the lucerne; oats are too thick, but wheat invariably stands up and admits plenty of air and light to the young plant. Lucerne flourishes best upon chalk, marl, stone brash, limestone, and calcareous clay, and although on many soils it will become full of natural grasses, they may be kept down by harrowing. Lucerne is seldom damaged by frequent cutting, but it is a mistake to let it come into full bloom before it is cut. It is capital food for all stock—even pigs will eat it—but it would be well to strictly observe the caution given by Mr. Molyneux with regard to sheep blowing upon it.

Lucerne (*Medicago sativa*).—Mr. E. Molyneux, writing to the 'Agricultural Gazette,' says:—Those who are acquainted with lucerne, or alfalfa as it is known in the Argentine, where it is largely cultivated, look upon it as indeed a valuable subject in a season of drought.

It would be well for those who do not know the plant to become quickly acquainted with its great value as a fodder plant. Against this plant there is, in the mind of many farmers, a great prejudice, occasioned, I think, by ignorance of the valuable qualities it possesses. Many persons of my acquaintance, who were for a long time sceptical of its value, are gradually becoming alive to the fact that lucerne has many more properties than they give it credit for, and are now regretting their obstinacy in rejecting its value for summer food. Lucerne, or, as previously noted, medicago, belongs to the order of Leguminosæ, or pod-bearing plants, and is really a hardy, herbaceous perennial.

M. sativa, or common lucerne, is the only variety of value to the farmer. It is said to have been brought from Asia to Greece. The Romans were well acquainted with its properties as a forage plant, especially for horses. Therefore it cannot be considered in any sense a new plant.

Lucerne is grown extensively in the Argentine, also in India and in the Danube valley. In these places of occasionally long drought its resisting powers in that respect make it invaluable. The whole secret of its value in dry weather is the marvellous manner in which it grows when once established. Its deep rooting nature is the sole cause of its success. I have seen roots 4 ft. long, just one straight, taplike root with but few

fibres. With a root of this description the plant is practically inured from the most exceptional drought.

In the Argentine roots of lucerne have been found growing in stone fissures 25 ft. in length. Some farmers say that such a deep-rooting plant is a dire robber of the soil. A knowledge of the order to which it belongs at once knocks this theory into the proverbial "cocked hat," as it is well known that all pod-bearing plants, such as sainfoin, peas, clover, and vetches, are saviours of nitrogen, because they obtain a portion of this element from other channels than the soil. As a robber of future crops, this plant is quite free from stigma.

From the year 1886 to ten years later, there was an increase of 12,535 acres in England alone in its cultivation, showing that farmers were realising its value.

I have no hesitation in saying that the next ten years will see a further advance in the cultivated area of this plant.

All kinds of stock—horses, cattle, sheep, and pigs—are fond of it in a green state. Some writers say it is valuable as hay, but in my opinion it is far too "woody." The stems become too stout in growth, partaking too much of twigs when allowed to remain until long enough for a hay crop. In this respect it differs from sainfoin, which is hollow in the structure of its stem.

It is strictly as a fodder or green plant that its virtue lies; all cattle that eat it maintain condition, but I should not like to say they become fat on this alone.

I do not think it thrives well in damp districts, it seems to love the drier counties. It is not impervious to severe frost during its early stages of growth, especially if the frost follows a wet autumn.

Deep calcareous loam is the most valuable soil for its growth, where its taproot may easily penetrate to a considerable depth, and be thus comparatively independent of rain.

For sheep, perhaps, it is most valuable as, growing vigorously, it may be eaten off by them four times in a season. Some horses do not take so kindly to it as they do to trifolium or vetches, owing to its being somewhat bitter in the juice. In a short time, however, they become accustomed to it.

I would caution sheep farmers when first turning their flock into it to carefully watch the ewes, and even the lambs, as they are apt to "blow," especially when taken into it with quite an empty stomach. In such case they are sure to eat ravenously. Shepherds quickly get accustomed to its danger in this respect. Some writers say that the most satisfactory results are obtained by first sowing in wide drills, keeping the

ound afterwards clean by hoeing. This is not my experience, or would I recommend such a plan, on the score of labour tailed in this cultivation. I have seen it succeed for ten years without once cleaning the land after it was sown. A thorough reparation of the land previous to sowing the seed is advisable. A turnip or swede crop, followed by oats or barley, and if the seed be sown with either of the latter, a reasonable chance of success is assured. Deep ploughing and the preparation of the seed bed to ensure a thorough tilth are elements of success not to be lightly disregarded. The month of March is a good time to sow the seed. After the corn is drilled or sown by hand, as the case may be, the lucerne may be sown at the rate of half-a-bushel to an acre by the aid of the hand seed-barrow. The final harrowing for the cereal is all that is required for the lucerne. At the end of September the crop following the harvesting of the corn may be mown, but it is not advisable to allow the sheep upon it the first season, or even the second, as they are apt to injure the crown of the plant by biting too low. The whole of the crop should be mown as often as desirable.

The third season, if all has gone well, the whole crop can be given to the sheep if required. Should grass grow freely amongst the plants after a few seasons' growth, as it may do if several winter dressings of manure are applied as a top-dressing to the surface, a couple of turns each way with iron harrows would scratch portions of this weed from amongst the plants. The early part of October, if the weather is dry, would be a suitable period for this work, and would tend to cleanse the ground, and subject the lucerne less to smother and weakly growth.

Systems of Farming.—Lord Rookwood, writing to the *Agricultural Gazette* upon the difficulty of farming with a profit at the present day, has given the following advice and suggestions:—He says: As one who has had some little practical experience in farming, I have often been surprised that in days when agriculture generally is supposed to have been more or less played out, laudlords and tenants, instead of standing aloof from one another as they often do, are not brought together by the common aim of mutual benefit, in the endeavour to make the land more paying than it is. As it is an acknowledged fact that farming as a paying game has been well-nigh a dead letter for years past, it would really seem worth while to contribute anything which might aim at solving the riddle in a way helpful to both.

There is a system of farming generally practised in Scotland which, if properly carried out, seems to offer some solution of

the question. The population of the rural districts of Scotland is sparse, and accordingly, instead of our four-course system, they adopt a rotation of grass, roots, barley, or oats, which, of necessity, very materially economises labour.

A field put down in oats or barley with grass seeds sown with them, after the crop is taken off, becomes a rough pasture, which remains for three or four years as grass land. It is then ploughed up and a root crop taken off it, when it again becomes ready for a repetition of the oats or barley and grass sowing.

By this system (advantageous to the tenant and not deleterious to the landlord), labour is reduced very considerably, as during the years of grass many less hands are required. Moreover, by a proper and careful division of the land, the diminution of labour may be permanently assured.

I realised the necessity of meeting the scarcity of labour some time back, and gradually brought part of my home farm into this system with satisfactory results. When one considers that the first outlay is really confined to the purchase of grass seeds, it will be easily realised how infinitely less the cost is than that of new machinery.

I am bold enough to think that if this Scotch system were more generally adopted, there would be fewer farms vacant and less reason to grumble over bad seasons.

Acidity of Cream.—In a letter to the 'Western Creamery,' Mr. W. H. Helman, of the San Juan Creamery, expresses the following views upon the above subject, which may be of interest to many of our readers:—I was having trouble with my butter, and after trying everything that I knew of and failing to find satisfaction, I thought I would get out of the old rut and try the acid test. The first thing I did after receiving a tester was to mix up a little of the solution and test my cream (about 12 hours after separation). I tasted the cream, and pronounced it not a little bit sour; then tried the test, with the result of 0·4 per cent. acid. Next morning I again tasted the cream when I was ready to put it into the churn, and still found it "a little sweet," though the acidity was 0·7 per cent. by the test.

So much for my taste, which I supposed had been serving me faithfully for several years past. I believe it is quite safe to say that at least one-half the butter-makers on this coast depend entirely on their taste. Since I adopted the new system there has been a great improvement in my product, and it certainly pays both the butter-maker and his employer. I have tested the cream at all stages, from the time it left the

parator up to the moment of putting it into the churn, and never found the test fail.

There is no doubt in my mind that butter-makers generally pay too little attention to this very important part of butter-making, not even depending on taste or smell—mostly on time. With the varying weather here, my butter would suffer considerably if I had a regular hour for churning, and churned at that time regardless of everything else, as I know many do. In this respect, the test is a drawback, for it makes things very inconvenient sometimes, especially in cold weather, by telling you that there is not enough acid. Many butter-makers say it is foolishness, and takes too much time. It takes me less than one minute to find out the acidity of my cream, which is certainly not too long a time to devote to improving the quality of the daily output.

The Destruction of Charlock in Field Crops by Spraying with Solution of Sulphate of Copper.—In 1897 an account appeared of some experiments made in France upon the destruction of charlock in barley and other crops by spraying with a solution of sulphate of copper. Some preliminary experiments were then made upon charlock in full flower among oats by Messrs. Christy and Dymond for the Essex Technical Instruction Committee, which showed very conclusively that the charlock was affected to a far greater extent than the oats. It was therefore decided to make further trials in 1898.

About the middle of April a field of barley was selected in which an abundance of charlock was making its appearance. By means of a strawsoniser, several strips of this, under varying conditions of weather and at different periods of growth, were sprayed with 1, 2, 4 and 6 per cent. solutions of sulphate of copper applied in quantities varying between 10 and 100 gallons per acre. A one per cent. solution was found to be too weak to kill all the charlock; a 6 per cent. solution was found to be strong enough to slightly damage the barley. Applied at the rate of 10 gallons an acre, some of the charlock escaped the spraying; 100 gallons was found to be far more than was necessary. *A 2 per cent. solution applied at the rate of 25 to 50 gallons an acre during dry weather and at an early period of growth, was found to be completely successful in destroying the charlock without injuring the barley.* When the rest of the field was yellow with charlock, the strips thus sprayed were entirely free, and the barley was growing stronger and had a better colour than in the rest of the field, there being no charlock to use up the nutriment of the soil.

Of the crops to which this treatment can be applied, 1

doubt barley is the most important, but it may be assumed that, if the necessity arises, any other cereal crops may be safely sprayed in the same manner. It has been found that peas, although at first the spraying slightly injures the young leaves, are in the long run quite unaffected, and this method may therefore be used to destroy the charlock in this crop. With regard to roots, mangolds were found to be uninjured, but swedes and turnips and some other plants allied to the genus *Brassica*, being of the same nature as charlock, would probably be destroyed by this treatment. Of other field weeds few seem to be affected by the spray, but thistles, though not killed, are blackened and stunted.

A convenient spraying apparatus is the "Knapsack Strawsoniser." Two men will be required, one to spray and the other to fill the reservoir when empty, and it will occupy two hours to spray one acre.

Messrs. Christy and Dymond give the following specific directions:—

Procure ground sulphate of copper (blue-stone or blue vitriol); dissolve 2 lbs. in every 10 gallons of water.

When spraying, pump hard enough with one hand to make the finest possible spray, and with the other direct the spray; walk down the middle of the stitch sufficiently slowly to insure *every leaf receiving some of the liquid*. For this, from 25 to 50 gallons of the solution will be required per acre.

Choose a still day for the spraying, or the fine spray will be blown off the stitch. The operation must be carried out in fine weather; a shower of rain falling before the solution has been absorbed is found to wash it from the leaves and leave the charlock uninjured.

Spray when the charlock first appears. At a later stage of growth, the charlock is shielded by the crop and may partly escape. If sprayed when the charlock is in flower, although the solution does not adhere to the petals and the bloom is not directly injured, the charlock is sufficiently damaged to prevent it from seeding.

Air Space in Cow Stalls.—The action of the Local Government Board in suggesting for cow stalls a minimum air space of 300 cubic feet per cow, led Mr. A. D. Hall, the Principal of the South-Eastern Agricultural College at Wye, to start experiments to ascertain the condition which the atmosphere of a cowshed should be brought into by the continuous confinement of a number of cows when the air space per cow was near the limit suggested, taking the proportion of carbonic acid as an index of the purity or otherwise of the air. To that end the cowshed

filled with cows and shut up for varying lengths of time from twenty-four to forty-eight hours, the air was analysed from time to time, and the temperature of the air inside and out was taken.

The cowshed at Wye is of an old-fashioned type, not over all ventilated. It is 7 ft. high at the eaves, and 14 ft. 3 in. at the ridge, and opens into an enclosed yard somewhat sheltered from the other buildings of the farm. The roof is a span roof of the Kingpost type, covered with lath and flat tiles, the eaves project about 6 inches, and the space between the rafters and pole is left open, along the ridge every other tile is left open. At the end there is an air space amounting to 27 square feet opening into a small mixing room. The floor is impervious, of concrete.

When the shed was filled with fifteen cows, the air space amounted to 745 cubic feet per cow, the superficial area of the floor per cow was 70 square feet, the open inlet area below was one-tenth square foot per cow, and the open outlet area above was one-fourth square foot per cow. The cows were large mixed, milking Shorthorns, averaging 1,200 to 1,400 lb. live weight, and the place was kept far more carefully closed than would happen in practice; all the doors and windows were shut; when men entered to milk, or to feed and water the stock, the doors were shut behind them so that the renewal of the air by draughts was avoided as far as might be.

From time to time estimations of the amount of carbonic acid in the air were made. The results obtained in two of the most extended trials were as follows:—

Date: April 3rd–5th, 1898. Air space, per cow = 745 cubic feet.

Confined.	Per cent. of Carbonic Acid by Volume.	Temperature Inside.
29 hours	·063	50 deg.
40 hours	·105	53 deg.
44 hours	·083	55 deg.
*49 hours	·046	52 deg.

Date: May 25th–26th, 1898. Air space, per cow = 930 cubic feet.

Confined.	Per cent. of Carbonic Acid by Volume.	Temperature Inside.
18 hours	·045	62 deg.
22 hours	·069	—
27 hours	·070	58 deg.
32 hours	·072	56 deg.

During and after milking, when there had necessarily been much opening of doors, &c.

Other trials gave similar results. The proportion of carbonic acid present in the air was always irregular, varying from .05 per cent. to .11 per cent.; if the cows were shut up at 6 A.M. the amount of carbonic acid in the air did not rise much before 10 A.M., by which time the inevitable coming and going of the men was over; the carbonic acid would then increase until the afternoon milking began. The milking caused a very thorough renewal of the atmosphere, but after the place was once more thoroughly closed for the night, the proportion of carbonic acid would rise, and reach a maximum of .10 to .11 per cent., or 10 to 11 volumes of carbonic acid per 10,000 of air, beyond which it never seemed to pass.

The purest country air contains about 3 volumes of carbonic acid per 10,000; 10 volumes per 10,000 is generally regarded as the maximum permissible in properly ventilated rooms. Carnelly and Haldane fix 9 per 10,000 as a maximum in schools, so that the highest figure obtained in these trials, viz., 11 per 10,000, indicates a very fair degree of purity in the air of the cowshed.

It was perfectly evident that the air remained in a reasonably sweet and wholesome condition.

The renewal of the atmosphere was without doubt due to gaseous diffusion. The slight rise of temperature, caused by the bodily heat of the cows, would be sufficient to bring the impure air near the roof, through which it would rapidly diffuse by the small spaces between the tiles, &c., as well as by the actual outlets.

The analyses showed that a very few minutes with open doors were sufficient to practically renew the whole of the air in the place.

Air space per cow seems therefore a very imperfect factor upon which to judge of the air supply to a cowhouse. In practice the purity of the contained air will be chiefly affected by the size and arrangement of the ventilation inlets and outlets, by the nature of the roof, and by the character of the floor; and it can be better judged by the senses, and by a comparison of the temperature inside and out, than from the cubic contents of the building.

If some minimum air space must be fixed for the guidance of the sanitary inspector, 800 cubic feet per cow seems an unnecessarily large allowance; it is far more than usually prevails in practice, and to judge from these experiments, more than is required to maintain the air in good condition, even in an old-fashioned cowhouse, kept closely shut.

The Manuring of Oats.—Professor Wright, recently lecturing in Scotland upon the results of experiments carried out during the past season on nineteen farms, said: Until recent years the great bulk of the manure had been applied in Wigtownshire to the root crop. In many parts of the county that was still the system, but there were some districts where it had become rather more prevalent to apply special dressings of manures to the oat crop. Up till a very recent time, there was very little evidence to show what were the best dressings to use for that purpose, and very little to show whether the manures applied to the oat crop gave a return sufficient to pay the cost of the manuring and leave a substantial profit or not. The series of experiments which the Technical College had carried out during the last four years on the manuring of oats was designed to throw light on that question. In the experiments carried out prior to 1898 they applied different kinds of manures alone, either a quantity of nitrate of soda alone, or a corresponding quantity of sulphate of ammonia alone. With these they found, as a rule, that there was an increase of crop, but it was very irregular. On some farms an increase was obtained which was not secured on other farms, and the tendency was rather to increase the straw than the grain, and the total profit was not very great. Then, instead of applying the manures alone, they applied them along with a certain amount of superphosphate and the combination was found to be more satisfactory. The nitrate encouraged specially the straw, while the superphosphate specially tended to affect the grain. Consequently the combination was found to give a good increase both in the straw and the grain, and what was more particularly striking was that these manures when applied together were found to be much more certain than when they were applied alone. Then they added a certain amount of kainit to supply potash, and this mixture was found to be still more effective, still more reliable, and still more profitable. One result of the addition of kainit was that it generally produced an earlier ripening of the crop. The plots with kainit looked like being ready for harvest a week or ten days earlier. In their experiments they had adopted 1 cwt. of nitrate of soda per acre as a standard to apply, but the quantity of nitrogen required must be largely determined by each farmer for himself, as it depended on the condition of the soil. What amount of superphosphate and kainit should be applied with 1 cwt. of nitrate of soda was a point on which their previous experiments had thrown no light. The quantity was arbitrarily selected without any special reason. Accordingly, the experiments of 1898 were especially designed to throw light on that point. There was great difference of opinion as to whetl

nitrate of soda or sulphate of ammonia was the better nitrogenous manure, and the experiments had been conducted so as to show the relative merits of these. Then on some of the plots basic slag was used instead of superphosphate. No investigation had hitherto been made, so far as he was aware to decide how far it could be used successfully as a manure for the oat crop. He thought that in the past season the experiments had been carried out even more carefully than ever before, which he ascribed to the fact that the farmers were more fully realising the real utility of the results obtained from these experiments. The following table shows the results obtained with the different combinations of manures :—

EXPERIMENTS ON OATS.

No. of Plot.	Kind of Manure.	Quantity per Acre.	Yield.	
			Grain.	Straw.
1	No Manure	—	Bushels. 52	Cwt. 29
2	Nitrate of Soda	1 cwt.	62	36
	Superphosphate	2 cwt.		
	Kainit	1 cwt.		
3	Nitrate of Soda	1 cwt.	67	35
	Superphosphate	2 cwt.		
	Kainit	2 cwt.		
4	Nitrate of Soda	1 cwt.	71	37
	Superphosphate	2 cwt.		
	Kainit	4 cwt.		
5	Nitrate of Soda	1 cwt.	70	37
	Superphosphate	4 cwt.		
	Kainit	2 cwt.		
6	Nitrate of Soda	1 cwt.	70	37
	Superphosphate	6 cwt.		
	Kainit	2 cwt.		
7	Sulphate of Ammonia	88 lb.	71	36
	Superphosphate	2 cwt.		
	Kainit	2 cwt.		
8	Sulphate of Ammonia	88 lb.	66	35
	Basic Slag	226 lb.		
	Kainit	2 cwt.		
9	Nitrate of Soda	1 cwt.	65	34
	Basic Slag	226 lb.		
	Kainit	2 cwt.		
10	Nitrate of Soda	1 cwt.	68	36
	Basic Slag	453 lb.		
	Kainit	2 cwt.		
11	Nitrate of Soda	1 cwt.	68	34
	Basic Slag	679 lb.		
	Kainit	2 cwt.		

On Plot 3 the addition of kainit had clearly been very profitable. The cost of the manures for that plot was 20s. per

re, and taking the increased yield of grain over the unmanured lot at 2s. per bushel, and the straw at 1s. 6d. per cwt., they had an increased value of 39s. per acre, or an additional profit of 19s. per acre after deducting the cost of manuring. On lot 7 the increased value was 48s. 6d. per acre, which, after deducting 20s. 6d. for manuring, left an increased profit of 28s. per acre. That was the most profitable plot in their experiments for the past year. The practical equality of the effect produced by nitrogen, whether applied in nitrate of soda or sulphate of ammonia, had been shown in all their experiments. Over the four years they had obtained practically the same increase, with a slight advantage in favour of nitrate of soda, but in 1898 the sulphate of ammonia stood better than the nitrate, and he inferred that the effect of these two manures varied to a certain extent according to the nature of the season. The experiments had confirmed him in the opinion which he had held for some years that there was nothing more profitable than the use of manures than their judicious application to the oat crop. They gave a good profit, and he had no hesitation in recommending them, except in the case of land that was so very good that the maximum crop could be grown without manures. Wherever basic slag was tried in comparison with superphosphate the latter showed itself superior for the oat crop. But both these manures were applied at the time the seed was sown, and it was held that the basic slag would give better effects if applied early in the winter. As to farmyard manure, the experiments had been entered upon late and the manure was only applied on the surface, so that he could not give them reliable results. They found that farmyard manure increased the straw more than the grain. There were a number of advantages attending the practice of top-dressing the oat crop to which he had not yet referred. For example, when light land was moughed after it had lain a considerable time in grass, it was ways more or less tough, involving a good deal of labour to bring it into condition. One effect of the dressing was to break down the turf so considerably as to lessen the amount of labour necessary. Then where large crops were grown weeds were more easily kept down. Where they had an increase of seven or eight cwt. of straw, which was practically not saleable on most farms and would be used for feeding, the farm would carry more stock, and that would make more farmyard manure which is the best material for keeping up the condition and fertility of the land. Thus the application of the top-dressing became the means of keeping up the general fertility of the land. Then there should be taken into account some residual value in the manures themselves. Nitrate of soda and sulphate of ammonia

were supposed to be exhausted the first year; but superphosphate and kainit had a residual value which probably increased the crops for three or four years after the year they were applied. But nitrate and sulphate made the roots longer as well as the grain, so that there was a quantity of organic matter left in the land which produced beneficial effects for years afterwards. Then there was the amount of protection which was afforded by such dressings of manure against the ravages of grub, which in some years would mean the saving of a large proportion of the crop. For these reasons he believed that the application of top-dressings of manure to the oat crop was beneficial.

The manures were all applied at the same time as the sowing of the seed, with the exception of the nitrate of soda, which was applied as a top-dressing to the crop. It should be applied as soon as the first shoots of the corn showed themselves through the ground. He was quite satisfied that nitrate had been frequently applied too late, and when applied too late it produced a larger increase of straw but light grain. That was not due to the nitrate, but to its late application. As to the quality of the grain, they had noticed quite distinctly in the experiments that the quality and weight per bushel were rather better from sulphate of ammonia when applied alone than from nitrate of soda applied alone, but if a quantity of superphosphate and kainit were added, then the quality was quite equal, perhaps better, and the weight quite as great, from nitrate as from sulphate. The kainit had a marked effect on the weight and quality of the grain. There had been practically no evidence obtainable as to which potash manure was best, but he preferred kainit, because it contained a quantity of salt, which was supposed to somewhat stiffen the straw of the oat crop. It was generally held that potash manures should be applied some months before the time of seed sowing, and the same held good with regard to basic slag. Also with regard to superphosphate the probability was that its results would be at least quite as good if applied a number of weeks before sowing. The ammonia, however, should be applied only with the seed and the nitrate as a top-dressing. The soils on which the experiments were carried out embraced most kinds of arable land from light to stiff soils; but the effect produced by manures of that class did not vary so much as might be supposed on different soil

The Farmer's Library.

NOTES AND REVIEWS OF NEW BOOKS.

—*Technical Mycology.* By Dr. FRANZ LAFAR. Translated by C. T. C. SALTER. London: Charles Griffin and Co. 15s.

THIS work had already made its mark in Germany, and had met with universal praise before the English edition appeared, and so rendered the contents available to the many workers in England who cannot read the original. The preface to the book is by Dr. E. C. Hansen, of Copenhagen, whose name and opinions are so well known and appreciated in England. In that preface Hansen says, "the contents will be a sufficient recommendation, and ensure the success of the work through its own inherent value." The work, though complete in itself, is to be followed by a further volume, and this will be anxiously looked for by everyone who has read the present volume.

Technical Mycology is an account of those modern discoveries regarding minute vegetable organisms—the yeasts and the bacteria—which have already been utilised in various industries. At the present time the evil influences of bacteria—how they are the cause of consumption or tuberculosis, of plague, of diphtheria, and of many of the ills which flesh is heir to—are occupying much attention. Amid the fear of these, the beneficial organisms are often forgotten, and it is a relief to turn to the pages of Dr. Lafar's work and study for a time the brighter and far more interesting aspect of this new-world life.

This study is of very special interest to the agriculturist, for these organisms are at work both in the soil, preparing food for the plant, and in the plant itself, whether in life or in decay. They play an important part alike in the manufacture and in the destruction of fermented liquids, such as beer and cider, whilst in the dairy they have a paramount influence for either good or evil. Turn where we will we find them at work, for or against us, in the home, the dairy, and the fields. No work in the English language describes our present know-

ledge of Technical Mycology more accurately than the one under notice. It is a rare combination of clear—one might almost say popular—description and scientific precision. We regret that it does not possess an Index, which is indispensable in a work that must of necessity be frequently, if not mainly, used as a work of reference. With this exception, we have nothing but praise for Dr. Lafar's admirable book.

2.—*Food Supply.* By ROBERT BRUCE. London: Charles Griffin and Co. 4s. 6d.

THE title of this work fails to convey an adequate idea of its contents. It is really a very short manual on Agriculture, and many of the subjects included in it are treated so briefly that it would have been better to have left them alone.

The most valuable, as well as the larger, portion of the book is that which treats of the live stock of the farm. This section is considerably enhanced in value by the numerous well-executed illustrations, mostly "from photographs of representative specimen animals, introduced and depended upon as a means of assisting the student to distinguish the different breeds, and to form an opinion regarding their several points and merits."

It is an eminently practical work, written by a man of experience both at home and abroad, an experience which has convinced him "that there are many fundamental principles connected with farming which may be said to be applicable under all circumstances."

The chief value of the work lies in the fact that it is the result of personal experience and observation. Moreover, it is written in a style which would appeal to, and be understood by, the average practical farmer.

The intention of the author, as expressed by himself, was "to touch upon a few of the principal factors connected with food production, as commonly carried out, with the view of assisting those who may not have had the opportunity of receiving a technical education bearing upon the subject of farming."

A work that takes up this position will be found of much value to those who have only recently commenced, or are about to commence, the actual business of farming.

3.—*The Rational Feeding of Live Stock.*

IN the 'Journal' for 1898 we noticed the Report of the first meeting of a new French Society, whose object was to devote attention to the subject which forms the title of this notice. We have since received the Report of the second Congress, which was held in Paris in March last.

The meeting was opened with a paper by Professor Mallèvre, in which he reviewed the progress made in foreign countries during the twelve months which had elapsed since the first Congress. He drew attention to recent progress in analytical chemistry as applied to feeding stuffs, by which certain substances formerly neglected or wrongly grouped can now be determined, and he showed the importance of these determinations.

For example, all nitrogenous substances were formerly grouped as albuminoids, and still are in most analyses. But it is well known that many of these nitrogenous bodies are not albuminoids; that they have not the same value as albuminoids, nor do they exist to the same extent in all foods. "What then is the value of these non-albuminoids?" asks M. Mallèvre.

Typical of these non-albuminoids is a substance known as asparagin. Carnivorous animals are unable to utilise this substance, but herbivorous animals can do so, and are able to convert it in their bodies into albuminoids proper. Therefore, in a ration for cows, asparagins can replace a certain quantity of albuminoids.

The vexed question of the influence of food on milk is discussed, and most of the recent experiments on this subject are reviewed, in an admirable paper, giving ample scope for thought and further study.

It would not be possible to mention here all the papers which were read at this Conference. Among them was an able one by M. Girard, showing the value of lucerne, and comparing it with meadow-hay, in which the following figures are given:—

—					Digestible Nitrogenous matter.	Digestible Carbohydrates.
100 parts lucerne	..	..	..	..	7·85	37·06
100 parts hay	..	..	..	..	4·81	51·18
Difference in favour of {					3·04	—
					—	14·12

On the second day of the Conference, M. Nicholas discussed the effect of castration on the milk yield of cows, and gave the results which had been obtained by castrating twenty-nine cows. An experiment in which seven cows were castrated and seven were not resulted as follows:—"The castrated cows produced less milk than those which were not castrated, viz., 9·10 litres, as against 9·42 litres per head per day; and they had gained in weight only 11,142 grammes, as compared with 58,571 grammes gained by the non-castrated cows. All the cows had exactly the same food." These results, as might be expected, gave rise to a very warm discussion. Doubt was principally thrown on the skill with which the operation had been carried out. M. Tisserand stated a case known to him where the result of the operation was "to prolong the period of lactation over twelve or fourteen months."

After reading carefully all that was said on this subject one can only feel that more knowledge is still wanted. Under certain conditions castration appears to have produced very beneficial results, while under other conditions the reverse seems to have been the case, and no one seems to know exactly what are the conditions of either success or failure.

This Society is evidently destined to play an important part in the future of French agriculture, if it is as well supported as it deserves to be.

4.—*Handbook of Insects injurious to Orchard and Bush Fruits.*

By ELEANOR A. ORMEROD. London: Simpkin, Marshall, and Co.

THE rapid and extensive development of the fruit-growing industry which has taken place during recent years has brought with it two evils probably not foreseen. One is that many injurious insects, "which even within the last four or five years were wholly unknown to us as fruit pests, have lately shown themselves as perfect scourges." And the second is that the increased extent of the areas in which one kind of orchard tree or fruit bush is grown, year after year, gives every opportunity for the established settlement of the insect feeders on that special crop.

In view of these facts, it is evident that every grower of fruit must pay increasing attention not only to the means of distinguishing the cause of a particular attack, but also to the best preventive measures and remedies for such attack.

The first requisite of a work, which, while dealing with so difficult a subject as the determination of the varieties of insect pests, is yet intended for those who have not been trained as observers, is that it should be well—indeed profusely—illustrated, for the most precise description of an insect fails to convey its form so clearly as a good illustration. This Miss Ormerod recognises; and the admirable illustrations, accompanied as they are by precise and detailed descriptions, render the work one that every intelligent farmer can utilise.

For over twenty-one years Miss Ormerod has been constantly at work gleaning information upon these subjects. From time to time she has published leaflets with reference to many of the attacks treated of in this book. But here we have all this information collected, rearranged, and brought up to date, and a most valuable work is the result. Written and intended for farmers, it appeals to a far wider class, and there is not a suburban dweller possessing a fruit garden, however small, who would not find the information contained in these pages most valuable.

Miss Ormerod's work is always thorough, and this book is no exception to the rule.

5.—*Jersey Cattle: their Feeding and Management.* London: Vinton and Co.

THIS handbook is published for the English Jersey Cattle Society, and is based on information received from its Members. The first thought which enters one's mind upon discovering that the book contains on no less than ninety-six points the opinions of the principal breeders of Jersey cattle, is that it is but a small production as the result of so much labour. But, on closer acquaintance, one is bound to admit that if it be little it is yet good. In fact, it is so replete with condensed summaries, and so devoid of padding, that in reading it one must needs occasionally stop and take breath, so to speak. Like all concentrated food it needs considerable time to digest and assimilate.

Another impression was that it would appeal only to Jersey breeders; but this was soon dispelled. In nearly every chapter there are facts recorded which are worthy the attention of all breeders and feeders of cattle. Take, for example, an extract from Chapter IV. on Calving: "All breeders seem agreed on one point, viz. that parturient apoplexy is caused

by allowing the animals to get into too high condition before calving." That fact has probably a far wider significance and interest than to breeders of Jersey cattle only. In truth the same may be said of the greater portion of the contents. Not so many years ago Jersey cattle were looked upon as ornamental rather than useful. There has been a slow change, and many now keep the Jersey cow for profit. How many herds of Jersey cattle exist we do not gather from this work; but it appears that the localities in which they thrive "vary in elevation from the sea-level to 600 feet above," while they may be found on all varieties of soil. With regard to the relative constitution of the English and Island-bred cattle there is a difference of opinion; but "the majority of the English breeders regard home-bred Jerseys as stronger in constitution than those bred on the Island."

In the preface we read, "The Jersey does not pretend to be a butcher's animal." The Society has done well to state this fact clearly, and to show that it is as a butter-producer that the Jersey excels, and will as such "pay for herself many times over in her dairy produce." This we believe to be the only standard by which a dairy cow can be properly judged. By recognising this fact a definiteness of aim and singleness of purpose have guided the compilers, and probably helped in no small degree to ensure the value of their work.

"The secret of the successful management of cattle generally, whether Jerseys or not, is to study the individuality of each animal." Such is the key-note of the work. How is it to be carried out as regards general management and feeding? How milk fever and abortion are to be prevented or dealt with? The rearing of calves; the testing of cattle; and some brief notes on dairying constitute the main subjects upon which information is given. We can confidently recommend this little work to every keeper of dairy cattle, even though he may not have a single Jersey in the herd.

6.—*The Story of the Farm.* By JAMES LONG. London: The Rural World Publishing Co.

THE author has brought together under the above title some essays which had previously appeared in print and has added to them others with a view "to call attention to certain cardinal features in connection with our agricultural system." The subjects dealt with appeal to the politician, the land-

wner, the farmer, and the labourer, while a special essay is devoted to the subject of women in relation to rural industries.

The object the author has had in view, both in the writing and collection of these essays, may be gathered from the Preface, wherein he writes as follows: "On the one hand the farmer is criticised and even ridiculed because he is said to fail to adapt himself to new conditions, his critics being, as a rule, themselves ignorant of the constitution of those conditions, and of the reasons why farmers are slow in effecting changes; while, on the other, agriculturists fail to recognise the two great elementary requirements of the hour—technical instruction, to which alone we can look for our advancement in knowledge and success; and co-operation, the only process which will promote the self-reliance, the economic and political power which enables men to act with justice in the hour of prosperity, and to face adversity without alarm. There are mistakes and misunderstandings all around, and some of these it has been my leisure to attempt to remove."

There is conclusive evidence in the book that the author is possessed of a strongly-marked sanguine temperament, which at times carries him away into dreams of what is possible utterly regardless of the enormous difficulties which beset some of his schemes. For instance, he is a bold man who dare state that "by means of well-directed legislation, every tillable acre of derelict and might soon be brought under prosperous cultivation." But it is this very optimistic spirit pervading all the essays which gives them one of their chief attractions. Whether we agree with the author or not we are compelled to think out afresh old topics and to consider new ones, and are well repaid for the small cost and time which a perusal of these essays entails.

1.—*The Manuring of Market Garden Crops.* By DR. BERNARD DYER. London: Vinton and Co. 1s.

WHILE considerable attention has been devoted to the use of artificial manures in the growth of all the staple farm crops, comparatively little attention has been paid to their influence on market garden crops. Yet, as Dr. Dyer very truly says, market garden crops are more heavily manured than any others except hops. For reasons, which he mentions, the manure used for these crops has been mainly dung, or bulky nitrogenous manures, and the market gardener "is too often not alive to the

fact that he is neglecting to supply the phosphates necessary to balance them, and to enable them to do their full work." That dung has its value the author fully realises, for its power of regulating the absorption and evaporation of water by and from the soil "makes it so useful that the market gardener cannot afford to neglect it."

But what quantity of dung could be used with advantage, and how far it might or should be supplemented with artificial manures, was not known. Hence, when some years ago an opportunity arose for Dr. Dyer to carry out experiments he wisely availed himself thereof. The results of these experiments were first published in the 'Agricultural Gazette,' and are now brought together in pamphlet form.

Six plots were selected for the experiments; one received 25 loads of dung per acre, the second 50 loads per acre, the third, fourth, and fifth, each 25 loads with phosphates, and 1, 2, and 4 cwt. of nitrate of soda per acre respectively. The sixth plot received no dung, but phosphates and 4 cwt. of nitrate of soda per acre. Cabbages, onions, cauliflowers, asparagus, artichokes, carrots, and celery were among the sixteen market garden crops experimented on. It is not possible to enter here into any record of the results obtained. Suffice it to say that they are of considerable value, not only to market gardeners, but to all who are anxious to grow the best crops of vegetables possible. They do not support the old notion that there is "nothing like muck." To use the author's own words, "our results indicate that heavy dunging is a costly extravagance, that for some crops chemical fertilisers alone are the most economical, but that on the average the best mode of manuring is to combine the use of a moderate quantity of dung with the liberal use of artificial fertilisers."

° — *The Great Horse. The Harness Horse. Young Race Horses.*

By SIR WALTER GILBEY, Bart. London: Vinton and Co.

THE fact that each of these three books is now in either its second or third edition is sufficient proof of their value, though the name of the author, who has made the study of the horse a special hobby, would alone be a guarantee of their merit. The first is mainly historical and shows how the great horse, at first required chiefly for purposes of war, has come to be the main worker in times of peace.

The object of the second volume is pithily put in the Preface,

he "preservation of the character of our English horses," which he author considers, "a matter of high national importance." Hence he here calls attention to "the desirability of breeding horses for harness, and releasing Britain from her present state of dependence for these upon the foreign breeder."

In the third volume dealing with Race Horses, the author says, "I am convinced that their deterioration has been due to the over grazing of the land whereon the dams and young stock were pastured—soundness, bone, muscle, and stamina depend very largely upon the treatment of the dams and young animals which, above all things, need fresh and untainted grazing." It is the old story ever true that success in any branch of agriculture needs a careful attention to all. Starve the soil and your loss does not end with diminished crops, but these being less nutritious affect the welfare of your live stock, and it spells ruin in the end. Penny wise and pound foolish is he who living on the soil is blind to the fact that if that be starved, naught else avails. It is only by going to the root of evil that we can hope to eradicate it, and those who are interested in the horse will find in these works the truth of this law enforced, and what to aim at as also what to avoid admirably set forth.

All three of these little books are well got up and excellently illustrated.

3.—*The Adulteration of Dairy Produce.* By R. HEDGER WALLACE. Edinburgh: C. and R. Anderson.

THE interest which has been taken in the subject of this *brochure* during the past few years is now likely to subside, as there is every prospect of a new law being passed during the present session of Parliament. If there are any who doubt that some amendment of the law was urgently needed, we would recommend them to study the facts which Mr. Wallace has brought together. Probably, if they were better known and more fully appreciated, the Government would have seen their way to amend the Sale of Food and Drugs Act even more drastically than they propose.

On no point is it more necessary that we should have laws which protect the public than as regards the use of preservatives in food. To assume that all preservatives are injurious—a position taken up by some faddists—is as ludicrous as to permit the unlimited use of any preservative. There are preservatives and preservatives; and, if merely the kinds and quantities which might be legitimately used were clearly defined, the

health of the public would be safeguarded without endangering any industry. It is evident that the use of preservatives is much more general than people imagine. Thus, Mr. Wallace says: "In the advertisement columns of four dairy papers I have found the following preservatives, twenty-one in number, advertised." And then follows the list.

Probably the most valuable information contained in this publication is that derived from, and showing what is done in, countries which supply us with dairy produce. The author has evidently taken considerable pains to collect this information, and it constitutes a record of facts that it would be difficult to obtain elsewhere.

Bath and West and Southern Counties Society.

CARDIFF MEETING, 1898.

JUDGES.

HORSES.

Shire.—J. NIX, Alfreton, Derbyshire.
Other than Shire.—J. P. TERRY, Berryfield, Aylesbury.
Colliery.—R. JONES, 3, Brunswick Place, Swansea.
Hunters.—W. H. DUNN, M.F.H., Wallingtons, Hungerford.
Hackneys.—C. E. COOKE, Hinxton Grange, Saffron Walden.
Ponies.—R. JONES, 3, Brunswick Place, Swansea.
Harness.—W. J. BUCKLEY, Llanelly; R. PELL, Chester.

CATTLE.

Devon.—H. FARTHING, Holway House, Taunton; P. H. TAMLYN, Boode House, Braunton, Devon.
Shorthorn and Dairy.—R. L. ANGAS, Blenheim, Woodstock; J. WEBB, Telton Ross, Barnetby Junction, Lincoln.
Hereford.—J. H. YEOMANS, Stretton House, Hereford.
Sussex.—R. HAMSHAR, Burgess Hill, Sussex.
Aberdeen Angus.—C. STEPHENSON, Sandyford Villa, Newcastle-on-Tyne.
Black Welsh.—J. M. GRIFFITHS, Penally Court, Penally, R.S.O., Pemb.; J. JONES, Bryn Melyn, Corwen.
Jersey.—C. C. TUDWAY, The Cedars, Wells, Somerset; Hon. A. E. ARKER, Culford Lodge, Bury St. Edmunds.
Guernsey.—J. STEPHENS, Grove House, Finchley.
Kerry and Dexter.—C. SIMMONS, Crowsley, near Henley-on-Thames.
Butter Tests.—E. MATTHEWS, Chequers Mead, Potter's Bar; J. STEPHENS, Grove House, Finchley.

SHEEP.

Cotswold.—W. T. GARNE, Aldsworth, Northleach, Gloucestershire.
Devon.—W. STEVENS, Budlake, Broadclyst, Exeter.
Southdown.—G. HAMPTON, Findon, Worthing, Sussex.
Hampshire Down.—F. P. BROWN, Northbrook House, Newbury.
Shropshire.—J. BEACH, The Hattons, Wolverhampton.
Oxford Down.—J. KENNY, Broadstone Hill, Chipping Norton.
Somerset and Dorset Horn.—J. CHICK, Compton Valence, Dorchester.
VOL. IX.—F. S. a

Welsh Mountain.—J. M. GRIFFITHS, Penally Court, Penally, R.S.O., Pemb. ; T. JONES, Bryn Melyn, Corwen.

Any Breed.—W. T. GARNE, Aldsworth, Northleach, Glos. ; F. P. BROWN, Northbrook House, Newbury.

PIGS.

Berkshire.—E. HAYTER, Whitechurch, Hants.

Large, Middle, and Small White, and Small Black.—A. S. GIBSON, The Elms, Ruddington, Nottingham.

Tamworth.—D. W. PHILIP, The Ashes, Whitacre, near Birmingham.

POULTRY.

W. B. TEGETMEIER, Alexandra Grove, N. Finchley ; P. PERCIVAL, Somerset Court, Brent Knoll.

PRODUCE.

Cheese.—E. HILL, Evercreech, Somerset.

Butter.—A. T. LORAM, 6, Eastgate, Exeter.

Cider.—C. ROOTES, Hereford.

BUTTER-MAKING, SHOEING, AND MILKING.

BUTTER-MAKING.

D. A. GILCHRIST, University Extension College, Reading ; A. T. LORAM, 6, Eastgate, Exeter.

SHOEING.

A. WHEATLEY, F.R.C.V.S., Reading ; F. W. WRAGG, F.R.C.V.S., 17, Church Lane, Whitechapel.

MILKING.

J. C. LOCK, Saltford, Bristol.

PRIZE AWARDS, 1898.

* * An animal designated in this list as the "reserve number" is entitled *conditionally*, to succeed to any prize that may become vacant in its class by of the animal placed above it by the Judges failing afterwards to qualify.

† Animals, where not otherwise stated, may be considered to have been by the Exhibitor.

ABBREVIATIONS EXPLAINED:—S., sire; d., dam; s. of d., sire of dam; y., y. m., month; w., week; d., day; R., Reserve; V.H.C., Very Highly Commended; H.C., Highly Commended; C., Commended.

All ages calculated to May 25, 1898.

HORSES.

FOR AGRICULTURAL PURPOSES.—SHIRE.

(Eligible for the Shire Horse Society's Stud Book.)

CLASS 1.—*Shire Stallion, foaled before 1896.* [5 entries.]

I. (£20.)—R. W. HUDSON, Danesfield, Marlow, Bucks, bay, **Trail** (15,401), foaled 1893, bred by W. Richardson, Chatteris, Cambs; s., Insur (11,668); d., Bonny Duchess (2137); s. of d., William the Conqueror.

II. (£10.)—LORD ROTHSCHILD, Tring Park, Tring, Herts, bay, **None's Rival**, foaled 1895; s., Gunthorpe Advance (13,136); d., Li (12,798); s. of d., Rival (2885).

III. (£5.)—LORD TREDEGAR, Stud Farm, Coedkernew, near Cardiff, **Valentine of Hothfield** (16,436), foaled 1895, bred by Lord Hothfield, Ashford, Kent; s., Insurgent (11,668); d., Dunsmore Chintz (14,643, xiv.); s. of d., Wisetone.

R.—P. A. MUNTZ, M.P., Dunsmore, Rugby, black, **Calwick Bridgroc** (16,040), foaled 1895, bred by J. W. Vondy, Grenaby, Bride, Isle of Man, Harold (3703); d., Great Rocks Lilly (8140); s. of d., Lord New (6092).

CLASS 2.—*Shire Stallion, foaled in 1896.* [9 entries.]

I. (£20.)—EARL EGERTON OF TATTON, Tatton Park, Cheshire, bay, **Forest Chief**; s., Royal William 2nd (12,207); d., Ayr Starlight (17,138 s. of d., Bury Victor Chief (11,105).

II. (£10.)—LORD ROTHSCHILD, Tring Park, Tring, Herts, black, **Croft Greatorix** (16,622), bred by the late S. B. Chadwick, Frodsham Bridge near Warrington, Cheshire; s., Apostle (14,455); d., Crofton Mover (16,467); s. of d., True Briton (2684).

III. (£5.)—I. N. WOODIWISS, Chevin Stud Farm, Duffield, near Derby, **Naillstone Bouncing Boy** (16,843), bred by P. Amos, Lang Gramford, Darlington; s., Challenger 3rd (12,910); d., Fanny Barr (12,300 s. of d., High Pressure (5954).

iv *Prizes awarded to Horses for Agricultural Purposes.*

R.—P. A. MUNTZ, M.P., Dunsmore, Rugby, black, **Dunsmore Heirloom** (16,655); s., Jeroboam (15,172); d., Scarsdale Marabon (18,844); s. of d., Marmion 2nd (9885).

H. C.—E. BAXTER, Hutton Park, Brentwood, Essex, bay, **Hitchin Fame** (16,724), bred by A. Ransom, Hitchin, Herts; s., Carlton Fame (9037); d., Hitchin Violet 2nd (6473, vol. x.); s. of d., Hitchin Conqueror (4458).

CLASS 3.—Shire Colt, foaled in 1897. [2 entries.]

I. (£15.)—LORD LLANGATTOCK, The Hendre, Monmouth, bay, **Hendre Conqueror**; s., Prince Harold (14,228); d., Nyn Lively (17,136); s. of d., Hitchin William the Conqueror (7399).

II. (£10.)—LORD ROTHSCHILD, Tring Park, Tring, Herts, black, **Jubilee Victor** (vol. xx.); s., Cœur de Lion 4th (11,233); d., Bury Starlight (9605); s. of d., Senator 2nd (6381).

CLASS 4.—Shire Mare and Foal, or in-Foal. [7 entries.]

I. (£20.)—LORD LLANGATTOCK, The Hendre, Monmouth, roan, **Hitchin Ruby 2nd**, foaled 1892, bred by A. Ransom, Hitchin, Herts; s., Hitchin Duke (9586); d., Hitchin Ruby; s. of d., Matchless (1542); with foal by Hitchin Conqueror (4458).

II. (£10.)—G. L. FOSTER-HARTER, Puckrup Hall, Gloucestershire, brown, **Judy 3rd** (5050), foaled 1886, bred by the late Duke of Marlborough, Blenheim Palace, Woodstock; s., Electric (3069); d., Judy Marlborough (3370); s. of d., Napoleon (1946); with foal by Hendre Crown Prince (16,177).

III. (£5.)—G. F. KING, Chewton Keynsham, Bristol, black, in-foal, **Chewton Smart**, foaled 1892; s., Normoon Black Prince (12,015); d. (vol. xx. S.H.S.B.).

CLASS 5.—Shire Filly, foaled in 1895. [4 entries.]

I. (£10.)—EARL EGERTON OF TATTON, Tatton Park, Cheshire, bay, **Dunsmore Golden**, bred by F. W. Griffin, Borough Fen, Peterborough; s., Dunsmore Wellington Boy (13,021); d., Lady Mary (8329); s. of d., King John (4502).

II. (£5.)—Sir W. GILBEY, Bart., Elsenham Hall, Essex, brown, **Hixon Gloaming** (21,932), bred by T. Appleby, Limecrofts, Utttoxeter; s., Harold (3703); d., Limecrofts Polly (6853, vol. xvi.); s. of d., Premier (2646).

R.—R. W. HUDSON, Dancesfield, Marlow, Bucks, bay, **Tatton Sunflower** (22,587), bred by Lord Egerton of Tatton; s., Royal William 2nd (12,207); d., The Empress (15,789); s. of d., Coronet (2750).

I. C.—LORD LLANGATTOCK, The Hendre, Monmouth, bay, **Dunsmore Hazelle** (21,705), bred by P. A. Muntz, M.P., Rugby; s., Dunsmore Wellington (13,021); d., Dunsmore Bracelet; s. of d., The Boy (3358).

CLASS 6.—Shire Filly, foaled in 1896. [6 entries.]

(£10, and Extra.)—Sir W. GILBEY, Bart., Elsenham Hall, Essex, bay, **Olinda Kitty** (vol. xix.); s., Prince William (3956); d., Olinda (10,606); s. of d., Royal Albert (1885).

Given by Shire Horse Society, a Gold Medal, value £10, for Best Mare or Filly in Class 4, 5, 6, or 7, subject to Special Conditions, as stated in Prize List.

Prizes awarded to any Agricultural Breed except Shire.

II. (£5.)—**EARL EGERTON OF TATTON**, Tatton Park, Cheshire, bay **Waverley Fearless**, bred by W. H. O. Duncombe, Waverley Park, Sandy Muntz; s., Duke of Worsley (13,002); d., Packington Brave Girl (13,117) of d., Measham Chief (6124).

III. (£2.)—**R. W. HUDSON**, Danesfield, Marlow, Bucks, bay, **Danesfield Colic**, bred by Louis Deane, Colstrop, Henley-on-Thames; s., Buckto larold (11,059); d. Ojeda (15,365); s. of d., Jolly Tom (4494).

R.—**G. L. FOSTER-HARTER**, Puckrup Hall, Tewkesbury, bay or brown **Puckrup Judy**; s., Hitchin Conqueror (4458); d., Judy 3rd (5050); s. of d. Electric (3069).

H. C.—**W. EMERSON**, Sweldon Farm, Cardiff, black, **Smart**, bred by (Gay, Preston; s., Tartar 2nd (15,385); d., Polly (4338); s. of d., Black Prince.

CLASS 7.—Shire Filly, foaled in 1897. [7 entries.]

I. (£10) and R. for Extra.*—**LORD LLANGATTOCK**, The Hendre, Monmouth, brown, **Kelvedon Marguerite**, bred by Major-General Sir Henry Stuart, K.C.B., Kelvedon, Essex; s., Curf Duncan (15,070); d., Nyn Pir 17,138; s. of d., Hitchin Duke (9586).

II. (£5.)—**Sir W. H. WILLS, Bart., M.P.**, Combe Lodge, Blagdon, R.S.C. Somerset, black, **Dunsmore Ida**, bred by P. A. Muntz, M.P., Dunsmore Rugby; s., Dunsmore Forest King (13,019); d., Barmaid (7410); s. of d. Bar None.

III. (£2.)—**EARL EGERTON OF TATTON**, Tatton Park, Cheshire, bay **Tatton Tapestry**; s., Royal William 2nd (12,207); d., Tartan (13,267) of d., Royal Sandy (3993).

R.—**G. H. WILLIAMS**, Coedy Garas, St. Mellons, Cardiff, bay, **Glamorga Fashion**, bred by R. E. Marende, Court Farm, Port Talbot; s., Count Squire; d., Marguerite; s. of d., Trentside 2nd.

ANY AGRICULTURAL BREED EXCEPT SHIRE.

CLASS 8.—Filly or Gelding, foaled in 1895. [1 entry.]

I. (£10.)—**LORDS A. and L. CECIL**, Orchardmains, Tonbridge, Ker Chestnut Clydesdale gelding, bred by — Dixon, Biggar Park, Biggar, N.B., Prince of Fortune (9826).

CLASS 9.—Filly or Gelding, foaled in 1896. [3 entries.]

I. (£10.)—**Mrs. A. LOWRIE**, Radyr Farm, near Cardiff, bay gelding **Farmer**; s., Trentside 2nd (8483); d., Bright; s. of d., Field Marshal.

II. (£5.)—**LORDS A. and L. CECIL**, Orchardmains, Tonbridge, Kent, bay Clydesdale filly, **Lady Calista**; s., Exquisite (8621); d., Edith Plant genet (6040); s. of d., Belted Knight (1395).

III. (£2.)—**LORDS A. and L. CECIL**, bay Clydesdale filly, **Cyclamen**; Exquisite (8621); d., Flower of Kilbride (11,253); s. of d., Lord Erski (1744).

* Given by Shire Horse Society, a Gold Medal, value £10, for Best Mare Filly in Class 4, 5, 6, or 7, subject to Special Conditions, as stated in Prize List.

ANY AGRICULTURAL BREED.

CLASS 10.—Stallion, that shall have travelled Glamorganshire during the year 1898. [1 entry.]

(Given by the Cardiff Local Committee.)

I. (£10.)—Miss TALBOT, Margam Park, Port Talbot, Glam., brown Clydesdale, **Montrave Major**, bred by J. Gilmour, Montrave; s., Prince of Albion (6178); d., Maggie 5th (10,627).

CLASS 11.—Mare and Foal, or in-Foal, to foal before July 1st.
[6 entries.]

(Given by the Cardiff Local Committee and confined to Tenant Farmers residing in Glamorganshire or Monmouthshire.)

I. (£8.)—W. EMERSON, Sweldon Farm, Cardiff, brown Shire, **Madam**, foaled 1894, bred by Mrs. S. Moseley, Derby; s., Senator 2nd (6381); d., Blossom; s. of d., Huntsman (3742).

II. (£4.)—T. D. JOHN, Chaldea's Stud Farm, St. Fagans, chestnut, **Newton Daisy**, bred by — Radcliff, Newton Farm, Burton-on-Trent; s., Wellington Boy (8606); d., Polly; s. of d., William the Conqueror.

H. C.—H. STUDD, Ty-gwyn, Clydach, Swansea Valley, black, in-foal, **Lady Tilo** (16,892), foaled 1892, bred by M. Thomas, Llwynmenny, Llandilo; s., Blagdon Bang Up (4875); d., Blackbird; s. of d., St. Cadog (4007).

CLASS 12.—Filly or Gelding, foaled in 1896. [5 entries.]

(Given by the Cardiff Local Committee and confined to Tenant Farmers residing in Glamorganshire or Monmouthshire.)

I. (£6.)—W. EMERSON, Sweldon Farm, Cardiff, black, **Smart**, bred by G. Kay, Preston; s., Tartar 2nd (15,385); d., Polly (4338); s. of d., Black Prince.

II. (£3.)—Mrs. A. LOWRIE, Radyr Farm, near Cardiff, bay cart gelding, **Farmer**; s., Trentside 2nd (8483); d., Bright; s. of d., Field Marshal.

R.—W. EMERSON, brown Shire filly, **Premier Lassie**; s., Premier William (15,289); d., Everton Lassie (6262).

CLASS 13.—Filly or Colt, foaled in 1897. [4 entries.]

(Given by the Cardiff Local Committee and confined to Tenant Farmers residing in Glamorganshire or Monmouthshire.)

I. (£6.)—R. S. DAVID, Wilton Farm, near Cowbridge, brown filly, **May Flower**; s., Montrave Major; d., Bright; s. of d., Field Marshal.

II. (£3.)—G. H. WILLIAMS, Coedy Garas, St. Mellons, Cardiff, bay, **Glamorgan Fashion**, bred by R. E. Marende, Court Farm, Port Talbot; s., County Squire; d., Marguerite; s. of d., Trentside 2nd.

R.—P. REES, Tycock Farm, Peterstone, Castleton, near Newport, bay Shire filly; s., Moulton Conqueror (6178); d., Stout; s. of d., Field Marshal.

COLLIERY HORSES.

CLASS 14.—*Mare and Foal, or in-Foal, not exceeding 13·2 hands adapted for Colliery purposes, but which has not yet been worked underground.* [2 entries.]

I. (£10.)—R. E. MARENDEZ, Court Farm, Port Talbot, dark bay old Welsh, in-foal, **Daisy**; d., Darling.

CLASS 15.—*Mare or Gelding, not exceeding 15·2 hands, adapted for Colliery purposes, but which has not yet been worked underground.* [4 entries.]

I. (£10.)—R. E. MARENDEZ, Court Farm, Port Talbot, grey Shire mare, **Silver Belle**, foaled 1890; s., Welsh Wonder; d., Sall.

II. (£5.)—LEWIS BROTHERS, Penrhiw, Blackwood, Mon., grey Shire gelding, **Champion**, foaled 1893, bred by — Frost, Llandenny, Usk, Mon.; s., The Pope.

III. (£2.)—J. MILES, Tydu Farm, St. Fagans, bay, **Chance**, foaled 1893; s., Field Marshal; d., Diamond; s. of d., Tommy Brown, with foal by Cannock Garfield.

CLASS 16.—*Mare or Gelding, not exceeding 15 hands, adapted for Colliery purposes, but which has not yet been worked underground.* [2 entries.]

(Given by the Cardiff Local Committee and confined to Tenant Farmers residing in Glamorganshire or Monmouthshire.)

I. (£8.)—E. FRANCIS, Ty Hir Farm, New Bridge, Mon., bright bay Shire gelding, **Silver King**, foaled 20th May, 1894, bred by L. Lewis, Ly Groes, Llanbedr, Breconshire; s., Prince of the Shire.

HUNTERS.

CLASS 17.—*Hunter Mare and Foal, or in-Foal.* [5 entries.]

I. (£20.)—B. G. H. GEE, Lock's Mills, Bristol, chestnut, **Fanny Fern** (H.I.S. 1377), foaled 1892, bred by M. P. Clery, Killmallock, Limerick; s. Clanronald; s. of d., Victor; with foal by Yard Arm.

II. (£10.)—J. HOMES, Ledbury, Herefordshire, brown, in-foal, **Circus Girl**, bred by E. A. Roeburter, Newcastle-on-Tyne; s., Storm Signal.

Special (Gold Medal).*—H. B. CORY, Druidstone, Castleton, Cardiff, brown, in-foal, **Brenda**; s., Free Trade; d., Carmen.

CLASS 18.—*Hunter Mare or Gelding, foaled in 1894.* [7 entries.]

I. (£20.)—F. R. FRY, Rock Hill, Keynsham, bay gelding, **Huntsman**, bred by T. Lawton and Sons, Cork.

II. (£10.)—HOLT and HOLT NEEDHAM, Castle Cary, Somerset, chestnut gelding, **Lifebuoy**, bred by A. B. Sherrin, High Ham, Langport; s., Lifeboat; d., Ruby; s. of d., Glenmore.

* Given by the Hunters' Improvement Society, a Gold Medal, or £5 and a Bronze Medal, for the Best Hunter Brood Mare, in-foal to or with Foal at-foot by, a Thoroughbred Horse or Registered Hunter Sire, under Conditions 47, stated in Prize Schedule.

R.—R. N. BYASS, Wyck Hill, Stow-on-the-Wold, bay gelding, **Unionist**; s., Candidate; d., Tormonite (H.I.S. 473); s. of d., The Lawyer.

CLASS 19.—Hunter Filly or Gelding, foaled in 1895. [6 entries.]

I. (£15).—T. D. JOHN, Chaldeans Stud Farm, St. Fagans, chestnut gelding, **Raby**, bred by J. Ingledew, Lowfield, Fencote, York; s., Knight of Raby; d., Jess (1421).

II. (£10).—HOLT and HOLT NEEDHAM, Castle Cary, Somerset, chestnut gelding, **Mariner**; s., Marioni; d., Rosette; s. of d., Scot Guard.

III. (£5).—G. B. G. HENSHAW, The Manor House, Purse Caundle, Sherborne, Dorset, black-brown gelding, **Goldfinder**, bred by T. A. Bagnell, Westwell, Burford, Oxon; s., Strathmore.

R.—W. TILL, Treworgan, Ross, chestnut gelding, **The Gem**; s., Fitztravers; s. of d., Munchausen.

CLASS 20.—Hunter Filly or Gelding, foaled in 1896. [9 entries.]

I. (£10).—T. D. JOHN, Chaldean's Stud Farm, St. Fagans, Cardiff, chestnut gelding, **Huntsman**, bred by J. R. Raby, Cayton, Scarborough; s., Roscius; d., Black Bess (entered for vol. viii.); s. of d., Camelot.

II. (£7).—HOLT and HOLT NEEDHAM, Castle Cary, Somerset, chestnut gelding, **Redlight**; s., Yard Arm; d., Ruby; s. of d., Glenmore.

III. (£3).—L. W. G. and G. B. G. HENSHAW, The Manor House, Purse Caundle, Sherborne, Dorset, chestnut filly, **Mermaid**; s., Yard Arm; d., Diana (996).

R.—J. HOMES, Ledbury, Herefordshire, chestnut gelding, **Silver King**, bred by J. Cooper, East Hadden, Northampton; s., Yard Arm; d., Freckles.

CLASS 21.—Hunter Filly, Colt or Gelding, foaled in 1897. [9 entries.]

I. (£10) and Special.*—HOLT and HOLT NEEDHAM, Castle Cary, Somerset, chestnut filly, **Killarney**, bred by J. C. Taylor, Milborne Port, Sherborne, Dorset; s., Yard Arm; d., Lady Ryan (1461); s. of d., Colonel Ryan.

II. (£7).—G. W. WILKES, Lyston Court, Tram Inn, R.S.O., Hereford, chestnut colt, **Mornington**; s., Rowington; d., May Morn; s. of d., Theologian.

III. (£3).—R. N. BYASS, Wyck Hill, Stow-on-the-Wold, bay colt, **Ulster Prince**; s., Ulster King; d., Tormonite (H.I.S. 473); s. of d., The Lawyer.

I. & H. C.—HOLT and HOLT NEEDHAM, grey filly; s., Master Ned; d., Master Ned.

HACKNEYS.

CLASS 22.—Hackney Foal, or in-Foal. 1st prize, £15—2nd prize, £10—3rd prize, £5.

NO ENTRY.]

* Given by the Hunters' Improvement Society, a Silver Medal for the Best Hunter Filly in Class 19, 20, or 21, not exceeding three years old (foaled in 1895, 1896, or 1897), under Conditions 48, stated in Prize Schedule.

CLASS 23.—Hackney Mare or Gelding, not exceeding 15 hands, and not under five years old, the property of a resident in South Wales or Monmouthshire. [3 entries.]

(Given by the Cardiff Local Committee.)

I. (£8.)—J. M. LEWIS, 16, Castle Road, Cardiff, dark bay mare, *May Queen*, foaled 1893.

R.—D. E. JONES, Llancaiach House, Llancaiach, Glam., dark brown gelding, *Earl of Cardigan*, 6 y.; s., *Cardigan Comet*; d., by *Welsh Flyer*.

CLASS 24.—Hackney Mare or Gelding, foaled before 1894. [4 entries.]

I. (£10.)—F. J. BATCHELOR, Hopwood Stud Farm, Alvechurch, Worcester-shire, chestnut gelding, *Lord Hopwood*, foaled 1893, bred by Captain Barlow, Warley Dale, Derbyshire; s., *Connaught*; d., *Lunis*; s. of d., *Star of the East*.

II. (£5.)—F. J. BATCHELOR, chestnut gelding, *Sir Cassius*, foaled 1893, bred by H. Daplyn, Hendringham, Norfolk; s., *Cassius*; d., *Mrs. Mann*; s. of d., *Little Wonder*.

R.—J. M. LEWIS, 16, Castle Road, Cardiff, dark bay mare, *May Queen*, foaled 1893.

CLASS 25.—Hackney Mare or Gelding, foaled in 1894 or 1895. [2 entries.]

I. (£10.)—E. S. GODSELL, Stroud, Gloucestershire, chestnut gelding, *Shooting Star*.

R.—D. E. JONES, Llancaiach House, Llancaiach, bay gelding, *Lord Beresford*, foaled 1895; s., *Ivanhoe*; s. of d., *Flying Atlas*.

CLASS 26.—Hackney Filly or Gelding, foaled in 1896. [3 entries.]

I. (£10.)—W. S. FORSTER, Rumwood, Langley, Maidstone, chestnut filly, *Actress* (10,637), bred by R. Marsh, Newmarket; s., *Agility* (2799); d., *Patch* (9392); s. of d., *Sir James 2nd* (1564).

R.—L. T. JOHN, Beggan Farm, Leckwith, roan filly, bred by W. R. Shirley, Woodlands, Leckwith; s., *Lord Bang*.

CLASS 27.—Hackney Filly, Colt, or Gelding, foaled in 1897. [5 entries.]

I. (£10.)—H. B. CORY, Druidstone, Castleton, Cardiff, chestnut filly, *Druidstone Dorothy*; s., *Agility* (2799); d., *Dorothy* (3703); s. of d., *Danegelt* (174).

II. (£5.)—H. B. CORY, chestnut filly, *Druidstone Duchess*; s., *Agility* (2799); d., *Dainty Duchess* (7745); s. of d., *Garton Duke of Connaught* (3009).

R.—J. JOSEPH, Cwmavon, Port Talbot, chestnut colt, *Lord Dacre 2nd*; s., *Lord Dacre* (H.S.B. vol. x. 4364); d., *Daisy*.

PONIES.

CLASS 28.—*Welsh Mountain Mare and Foal, not exceeding 13·1 hands, the property of a resident in South Wales or Monmouthshire.*
[1 entry.]

(Given by the Cardiff Local Committee.)

I. (£5.)—A. MILLARD, 48, Treherbert Street, Cathays, Cardiff, dark bay, **Gipsy**, aged, bred by Wm. George, Quaker's Yard; s., Merthyr Express; d., Mountain Maid; with foal by Young Lord Bang.

CLASS 29.—*Pony Mare or Gelding, 4 years old or over, exceeding 13 hands and not exceeding 14 hands.* [2 entries.]

I. (£10.)—E. S. GODSELL, Stroud, Gloucestershire, chestnut gelding, **Nobility**.

CLASS 30.—*Pony Mare or Gelding, not exceeding 14 hands, the property of a resident in South Wales or Monmouthshire.*
[2 entries.]

(Given by the Cardiff Local Committee.)

I. (£8.)—E. JONES, Manoravon, Llandilo, South Wales, bay gelding, **Taffy**, foaled June, 1892; s., King Flyer; d., Old Fashion.

II. (£4.)—D. E. JONES, Llanctaiach House, Nelson, Glamorganshire, dark cream Welsh, **Lady Lewis**, foaled 1894; s., Morning Star.

CLASS 31.—*Pony Mare or Gelding, four years old or over, not exceeding 13 hands.* [1 entry.]

I. (£10.)—W. R. FLOWER, West Stafford, Dorchester, brown Exmoor, **Chatterbox**, 6 y.

HARNESS.

CLASS 32.—*Pair of Carriage Horses (Mares or Geldings), 15 hands or over, driven in double harness on the second day of Show.*
[3 entries.]

I. (£15.)—E. S. GODSELL, Stroud, Gloucestershire, browns, **Lord Bath** and **Duke of York**.

CLASS 33.—*Mare or Gelding, 15 hands or over, driven in single harness on the second day of Show.* [8 entries.]

I. (£8.)—E. S. GODSELL, Stroud, Gloucestershire, brown mare, **Lady** **Jeffrey**.

II. (£4.)—E. S. GODSELL, brown gelding, **Duke of York**.

III. (£4.)—R. D. GRIFFITHS, Brynteg, Pontypridd, chestnut, **Lord** **Byron**, 5 y.; s., Lord Byron.

IV. (£4.)—W. SMITH, 38, Castle Road, Cardiff, dark chestnut, **May Bloom**, foaled 1894, bred by W. Emerson, Swelldon Farm, Caeran, near Cardiff; s., Robert Ellesmere.

CLASS 34.—Pair of Horses (Mares or Geldings), under 15 hands, driven in double harness on the third day of Show. [1 entry.]

I. (£15).—F. J. BATCHELOR, Hopwood Stud Farm, Alvechurch, chestnut mare, **Lady Fancy**, foaled 1893; s., Cassius; d., Polly; s. of d., Model; and chestnut gelding, **Sir Cassius**, foaled 1893, bred by H. Daplyn, Hendringham, Norfolk; s., Cassius; d., Mrs. Mann; s. of d., Little Wonder.

CLASS 35.—Mare or Gelding, over 14 hands and under 15 hands, driven in harness on the third day of Show. [16 entries.]

I. (£8).—E. S. GODSELL, Stroud, Gloucestershire, chestnut gelding, **Shooting Star**.

II. (£4).—F. J. BATCHELOR, Hopwood Stud Farm, Alvechurch, Worcester-shire, chestnut gelding, **Sir Cassius**, foaled 1893, bred by H. Daplyn, Hendringham, Norfolk; s., Cassius; d., Mrs. Mann; s. of d., Little Wonder.

III. (£2).—N. REES AND SON, Cardiff, dark bay gelding, **Taffy**, foaled 1892.

V. H. C.—G. BOYLES, 29, Taff Street, Pontypridd, roan, **Viscount Bang**, foaled 1894, bred by J. Miles, Ty Dhu Farm, near St. Fagans; s., Lord Bang; l., Minny.

H. C.—J. M. LEWIS, 16, Castle Road, Cardiff, dark bay mare, **May Queen**, foaled 1893.

C.—A. G. FENNELL, 128, Queen Street, Cardiff, dark brown gelding, **The Champion**, foaled 1893, bred by B. Phillips, Great House Farm, Undy Major; s., Herschel; d., Nudlegum.

CLASS 36.—Tandems (Mares or Geldings), 15 hands or over, to be driven in harness on the fourth day of Show.

[No EXHIBIT.]

CLASS 37.—Tandems (Mares or Geldings), under 15 hands, driven in harness on the fourth day of Show. [2 entries.]

I. (£15).—F. J. BATCHELOR, Hopwood Stud Farm, Alvechurch, chestnut gelding, **Sir Cassius**, foaled 1893, bred by H. Daplyn, Hendringham, Norfolk; s., Cassius; d., Mrs. Mann; s. of d., Little Wonder; and chestnut mare, **Lady Fancy**, foaled 1893; s., Cassius; d., Polly; s. of d., Model.

II. (£5).—E. S. GODSELL, Stroud, Gloucestershire, chestnut geldings, **Shooting Star** and **Nobility**.

CLASS 38.—Dray or Cart Mare or Gelding, suitable for and having been worked by a Cardiff Brewer, Builder, Timber Merchant, Tradesman or Haulier, or the Corporation, for a period of not less than six months prior to the date of the Show; exhibited with gear on the fourth day of Show. [7 entries.]

(Given by the Cardiff Local Committee.)

I. (£6).—S. A. BRAIN AND COMPANY, LIMITED, Old Brewery, Cardiff, bay gelding, **Champion**, aged.

II. (£3.)—ROBINSON, DAVID AND COMPANY, Timber Importers, Cardiff, bay mare, **Darling**, bred by J. Evans, Ludlow.

H. C.—J. MOON, Hope Street, Cardiff, bay gelding, **Captain**, foaled 1892.

CLASS 39.—*Mare or Gelding, over 13 hands and not over 14 hands, driven in harness on the fifth day of Show.* [10 entries.]

I. (£10.)—E. S. GODSELL, Stroud, Gloucestershire, chestnut gelding **Nobility**.

II. (£5.)—E. JONES, Manoravon, Llandilo, South Wales, bay gelding, **Taffy**, foaled June 1892; s., King Flyer; d., Old Fashion.

III. (£2.)—W. JONES, 53, Fitzhamon Embankment, Cardiff, dark bay gelding, **Jolo Morgamog**; s., Abdullah; d., Modest Girl.

R. & H. C.—S. EVANS, Penycraig, dark bay mare, **Princess Maud**, foaled 1893; s., Cymro Bach; d., Nancy; s. of d., Trotting Briton.

CLASS 40.—*Mare or Gelding, not over 13 hands, driven in harness on the fifth day of Show.* [4 entries.]

I. (£8.)—A. E. GOULD, East Shrubbery, Redland, Bristol, bay gelding, **Little Wonder**, 6 y., bred by — Murphy, Bristol; s., Eclipse; d., Jenny.

II. (£4.)—A. JEPSON, Mwyndy, Llantrisant, **Lady Windsor**, 4 y.

R. & H. C.—W. R. FLOWER, West Stafford, Dorchester, brown Exmoor, **Chatterbox**, 6 y.

CLASS 41.—*Light Mare or Gelding, the property of a Cardiff Tradesman, used solely by him and driven regularly by his servants for the delivery of his goods, and having been in his possession for a period of not less than six months prior to the date of the Show; exhibited in trade cart and harness on the fifth day of Show.* [12 entries.]

(Given by the Cardiff Local Committee.)

I. (£6.)—A. G. FENNELL, 128, Queen Street, Cardiff, roan gelding, **The Don**; s., Trustful; d., Old Express.

II. (£3.)—A. R. SMALL, 10, Splott Road, Cardiff, bay mare, **Jewel**, foaled 1893.

R. & V. H. C.—J. MOON, Hope Street, Cardiff, black gelding, **Moonlight**, foaled 1892.

H. C.—A. G. FENNELL, dark brown gelding, **The Champion**, foaled 1893, bred by B. Phillips, Great House Farm, Undy Major; s., Herschel; d., Nudlegum.

C.—S. T. WOOD, 17, Llanfair Road, Cardiff, mare.

CATTLE.

DEVON.

CLASS 42.—*Devon Bull, calved in 1894 or 1895.* [6 entries.]

I. (£15.)—J. F. R. MORRIS, Marwood, Barnstaple, **Middling Character**, 11 m., 4 d., bred by Sir W. Williams, Upcott, Barnstaple; s., Pretty Midding (2859); d., Fancy 6th (11,887); s. of d., Captain (2204).

II. (£10.)—W. TRICK, Flitton Barton, North Molton, **Duke of Flitton** 68), 3 y., 4 m., 3 w., 4 d.; s., Lovely Laddie 3rd of Pound (3515); d., rly 8th (12,584); s. of d., Briton (2349).

III. (£5.)—A. C. SKINNER, Pound Farm, Bishop's Lydeard, Somerset, **Duke of Pound 27th** (3572), 3 y., 6 d.; s., Lord Punchard (3148); d., chess 17th (8988); s. of d., Lord Currypool (1589).

R. & H. C.—E. MUCKLOW, Whitstone Head, Cornwall, **Magna Charta**, 2 m., 2 w., 4 d.; s., Merryman (3211); d., Dorothy (11,670); s. of d., rd Wolseley (2063).

H. C.—J. C. WILLIAMS, Caerhays Castle, St. Austell, **Afterthought**, bred 21st April, 1894, bred by Sir W. R. Williams, Bart., Upcott; s., etty Middling 2nd; d., Fiction 3rd (11,889); s. of d., Captain (2204).

C.—E. MUCKLOW, **Commander-in-Chief**, 3 y., 1 m.; s., Marquis of olseley (3162); d., Whitstone Rosewater (12,956); s. of d., Duke of Pound th (2391).

CLASS 43.—*Devon Bull, calved in 1896.* [6 entries.]

I. (£15.)—A. C. SKINNER, Pound Farm, Bishop's Lydeard, Somerset, **Duke of Pound 29th** (3725), 2 y., 3 m., 3 w., 6 d.; s., Masterpiece (2837); d., Duchess 35th (13,075); s. of d., Lord Wolseley (2063).

II. (£10.)—Sir W. R. WILLIAMS, Upcott, Pilton, Barnstaple, **Robert sorge** (3801), 1 y., 11 m., 1 w., 4 d.; s., Pretty Middling 2nd (3172); d., ction 3rd (11,889); s. of d., Captain (2204).

III. (£5.)—A. C. SKINNER, **Duke of Pound 30th** (3726), 1 y., 10 m., w., 6 d.; s., Masterpiece (2837); d., Duchess 29th (11,727); s. of d., ron Golsoncott 4th (2193).

R. & H. C.—J. C. WILLIAMS, Caerhays Castle, St. Austell, **Kimberley**, bred 12th April, 1896; s., Pretty Middling (2859); d., Diamond Necklet 781); s. of d., Bravo (1686).

CLASS 44.—*Devon Bull, calved in 1897.* [8 entries.]

I. (£10.)—A. C. SKINNER, Pound Farm, Bishop's Lydeard, Somerset, **oyalist 4th of Pound**, 1 y., 3 m., 2 w., 5 d.; s., Masterpiece (2837); d., osalie (10,175); s. of d., Rob Roy (1831).

II. (£5.)—A. BOWERMAN, Capton, Williton, Taunton, **Sir Walter**, 1 y., m., 2 w., 3 d.; s., Lord Culverhay (3469); d., Apricot (13,743); s. of d., lmerston (2474).

III. (£2.)—E. J. STANLEY, M.P., Quantock Lodge, Bridgwater, **Quantock ubilee**, 1 y., 4 m., 2 w.; s., Tregothnan (2902); d., Beauty 9th (12,118); of d., Duke of Wellington (1935).

R. & H. C.—J. C. WILLIAMS, Caerhays Castle, St. Austell, calved 23rd February, 1897; s., *Pretty Middling* (2859); d., *Apple Blossom* (7973); s. of d., *Tempter* (1851).

CLASS 45.—Devon Cow, in-Milk or in-Calf, calved before 1895.

[3 entries.]

I. (£15).—A. BOWERMAN, Capton, Williton, Taunton, *Majestic* (13,767), 3 y., 4 m., 3 w., 4 d.; s., *Starlight* (3514); d., *Snow* (13,786); s. of d., *Admiral Wood* (1880).

II. (£10).—Hon. E. W. B. PORTMAN, Hestercombe, Taunton, Somerset, *Handsome 3rd* (14,665), 4 y., 5 m., 3 w., bred by J. Blackmore, Buckland, Durston, Taunton; s., *Nobleman* (2848); d., *Handsome 2nd* (7497); s. of d., *Actor*.

III. (£5).—E. J. STANLEY, M.P., Quantock Lodge, Bridgwater, *Quantock Beauty 11th* (13,638), 4 y., 9 m., 2 w.; s., *Baronet* (1897), d., *Beauty 8th* (11,404); s. of d., *Duke of Wellington* (1935).

CLASS 46.—Devon Heifer, in-Milk or in-Calf, calved in 1895.

[4 entries.]

I. (£10).—A. BOWERMAN, Capton, Williton, Taunton, *Sally*, 3 y., 4 m., 2 w., 1 d.; s., *Starlight* (3514); d., *Dolly 5th* (9482); s. of d., *Lord Ilbear* (1779).

II. (£5).—W. TRICK, Flitton Barton, North Molton, *Duchess of Flitton 2nd* (14,843), 2 y., 6 m., 2 w.; s., *Fisherman* (2977); d., *Curly 8th* (12,584); s. of d., *Briton* (2349).

III. (£2).—A. C. SKINNER, Pound Farm, Bishop's Lydeard, Somerset, *Fancy 21st of Pound* (14,774), 2 y., 11 m., 1 w., 6 d.; s., *Compensator* (2942); d., *Fancy 17th* (12,430); s. of d., *General Gordon* (1974).

R. & H. C.—E. J. STANLEY, M.P., Quantock Lodge, Bridgwater, *Quantock Cowslip 10th* (14,800), 3 y., 1 w.; s., *Tregothnan* (2902); d., *Cowslip 3rd* (9089); s. of d., *General Colley* (1564).

CLASS 47.—Devon Heifer, calved in 1896. [8 entries.]

I. (£10).—Sir W. R. WILLIAMS, Upcott, Pilton, Barnstaple, *Fiction 6th* (15,518), 2 y., 4 m., 3 w., 3 d.; s., *Pretty Middling 2nd* (3172); d., *Fiction 4th* (12,580); s. of d., *Captain* (2204).

II. (£5).—A. BOWERMAN, Capton, Williton, Taunton, *Mustard* (14,976), 2 y., 2 m., 1 w., 5 d.; s., *Lord Culvershay* (3469); d., *Apricot* (13,743); s. of d., *Palmerston* (2474).

III. (£2).—E. J. STANLEY, M.P., Quantock Lodge, Bridgwater, *Quantock Moss Rose 23rd* (15,428), 2 y., 3 m., 1 d.; s., *Tregothnan*, 2902; d., *Moss Rose 10th* (7109); s. of d., *General Colley* (1564).

R. & H. C.—A. C. SKINNER, Pound Farm, Bishop's Lydeard, Somerset, *Myrtle 54th of Pound* (15,400), 2 y., 2 m., 1 w., 5 d.; s., *Compensator* (2942); d., *Myrtle 44th of Pound* (3610); s. of d., *Masterpiece* (2337).

R. & H. C.—A. BOWERMAN, *Nutmeg*, 2 y., 1 m., 5 d.; s., *Pretty Middling 3rd* (3173); d., *Famous* (13,755); s. of d., *Starlight* (3514); —H. P. S. LOVING, Cannington, Bridgwater, *Beauty*, 2 y., 3 m., 12 w., bred by E. Kidner, Cannington Park, Bridgwater; s., *Harold 3rd* (3127); d., *Dairymaid 3rd* (14,529); s. of d., *Harold* (2790); —and Hon. E. W. B. PORTMAN, Hestercombe, Taunton, Somerset, *Gentlemaid* (15,340), 2 y., 4 m., 2 w.; s., *Duke of Currypool* (3096); d., *Beatrice* (11,967); s. of d., *Lord Dorchester* (2435).

CLASS 48.—Devon Heifer, calved in 1897. [7 entries.]

I. (£7.)—J. C. WILLIAMS, Caerhays Castle, St. Austell, calved 8th March, 1897; s., Pretty Middling (2859); d., Diamond Necklet 3rd (12,560); s. of d., Duke of Flitton 17th (1544).

II. (£5.) J. C. WILLIAMS, calved 9th January, 1897; s., Afterthought (3375); d., Nessie 2nd (14,392); s. of d., Cardsharper (3082).

III. (£2.) A. C. SKINNER, Pound Farm, Bishop's Lydeard, Somerset, **Myrtle 58th of Pound**, 1 y., 3 w., 5 d.; s., Masterpiece (2837); d., Myrtle 38th (13,081); s. of d., Lord Passmore 2nd (2628).

R. & H. C.—A. BOWERMAN, Capton, Williton, Taunton, **Poteen**, 1 y., 4 m., 3 w., 2 d.; s., Pretty Middling 3rd (3173); d., Myrtle (13,773); s. of d., Palmerston (2474).

H. C.—E. MUCKLOW, Whitstone Head, Cornwall, **Whitstone Delight** (vol. xxi.), 11 m., 1 w., 3 d.; s., Merryman (3211); d., Dorothy (11,670); s. of d., Lord Wolseley (2063):—Hon. E. W. B. PORTMAN, Hestercombe, Taunton, Somerset, **Lowton** (vol. xxi. Devon H.B.), 2 y., 4 m., 3 w., 2 d., bred by E. A. Buncombe, Longforth, Wellington, Somerset; s., Wellington Boy (vol. xxi.); s. of d., Myrtle Jubilee Boy (2294):—and A. C. SKINNER, **Duchess 43rd of Pound**, 1 y., 3 m., 3 w., 4 d.; s., Masterpiece (2837); d., Duchess 35th (13,075); s. of d., Lord Wolseley (2063).

SHORTHORN.

CLASS 49.—Shorthorn Bull, calved in 1894 or 1895. [8 entries.]

I. (£15.)—P. L. MILLS, Ruddington Hall, Nottingham, roan, **Marengo** (69,068), 3 y., 3 m., 2 w., 5 d., bred by W. Duthie, Tarves, Aberdeen; s., Scottish Archer (59,893); d., Missie 118th; s. of d., William of Orange (50,694).

II. (£10.)—R. STRATTON, The Duffryn, Newport, Mon., roan, **Alto** (68,147), 3 y., 2 w.; s., Excelsior (65,466); d., Timbrel 5th; s. of d., Roan Seal (43,955).

III. (£5.)—G. HARRISON, Gainford Hall, Darlington, roan, **Cornelius** (66,864), 3 y., 7 m., 1 w., 4 d., bred by A. M. Gordon, Newton, Aberdeenshire; s., Touchstone (60,073); d., Butterscotch; s. of d., Star of Morning (58,189).

R.—Mrs. M. LEWIS, Clynfiew, Boncath, R.S.O., red and little white, **Lord Marmion** (68,980), 3 y., 10 m., 1 w., 1 d., bred by A. T. Fortescue, Kingcausie, Aberdeen; s., Star of Morning (58,189); d., Lady Meredith (vol. xxxvi. p. 400); s. of d., Rosario K (54,936).

H. C.—H. T. COOKSON, Sturford Mead, Warminster, dark roan, **Count William** (68,417), 3 y., 7 m., 3 d., bred by J. D. Willis, Bapton Manor, Codford St. Mary, Bath; s., Count Lavender (60,545); d., Lady Mary 12th; s. of d., William of Orange (50,694).

CLASS 50.—Shorthorn Bull, calved in 1896. [7 entries.]

I. (£15.)—G. HARRISON, Gainford Hall, Darlington, white, **Misty Morning** (71,021), 2 y., 3 m., 3 w., 6 d., bred by W. Duthie, Collynie, Tarves, N.B.; s., Pride of Morning (64,546); d., Missie 137th; s. of d., William of Orange (50,694).

II. (£10.)—J. D. WILLIS, Bapton Manor, Codford, Wilts, roan, **Bapton Victor**, 2 y., 3 m., 3 w., 5 d.; s., Count Victor; d., Cowslip; s. of d., Baron Bridekirk 3rd.

III. (£5).—S. HILL, J.P., Langford House, Langford, Bristol, roan, **Wiltshire Victor**, 2 y., 3 m., 1 w., 4 d., bred by J. D. Willis; s., Count Victor (66,877); d., Wiltshire Daisy; s. of d., Rising Star (54,920).

R.—H. T. COOKSON, Sturford Mead, Warminster, roan, **Lavender Archer** (70,755); 2 y., 4 m., 1 w., 2 d., bred by W. Duthie; s., Scottish Archer (59,893); d., Sittyton Lavender; s. of d., Gravesend (46,461).

H. C.—R. STRATTON, The Duffryn, Newport, Mon., roan, **Captain Pansy**, 2 y., 1 m., 2 w., 5 d., bred by the late J. Garne, Great Rissington, Gloucestershire; s., Scottish Monarch (67,886); d., Petted Pansy 3rd; s. of d., Baronet (52,459).

CLASS 51.—Shorthorn Bull, calved in 1897. [11 entries.]

I. (£10).—J. D. WILLIS, Bapton Manor, Codford, Wilts, roan, **Bapton Count**, 1 y., 3 m., 2 w., 4 d.; s., Count Lavender; d., Trebelli; s. of d., Scottish Archer.

II. (£5).—R. STRATTON, The Duffryn, Newport, Mon., roan, **Puck**, 1 y., 3 m., 6 d.; s., Alto (68,147); d., Fairy Dream; s. of d., Fitz Mowbray (49,591).

III. (£2).—P. L. MILLS, Ruddington Hall, Nottingham, roan, **First Favourite**, 1 y., 4 m., 1 w., 5 d., bred by W. Duthie, Tarves, Aberdeen; s., Golden Count (68,711); d., First Strawberry; s. of d., First Choice (58,950).

R.—G. HARRISON, Gainford Hall, Darlington, roan, **Weston Swall**, 1 y., 4 m., 2 w.; s., Champion Cup (65,240); d., Weston Duchess 10th; s. of d., Cherry Stone (49,269).

H. C.—H. T. COOKSON, Sturford Mead, Warminster, red and little white, **Viscount**, 1 y., 3 m., 3 w., 6 d.; s., Count William (68,417); d., First Rose (vol. xxxviii. p. 352); s. of d., First Choice (58,950).

CLASS 52.—Shorthorn Cow, in-Milk or in-Calf, calved before 1895. [5 entries.]

I. (£15).—C. W. BRIERLEY, Twyford, Brimfield, R.S.O., roan, **Queen of Hearts** (vol. xliii. p. 337, H.B.), 4 y., 10 m., 4 d.; s., Rosedale Referee (61,650); d., The Queen; s. of d., Rufus (48,648).

II. (£10).—L. DE ROTHSCHILD, Ascott Home Farm, Leighton Buzzard, red and white, **Hawford Necklace**, 4 y., 1 m., 1 w.; s., Wanderer (60,138); d., Namesake; s. of d., Calderwood (57,010).

III. (£5).—G. HARRISON, Gainford Hall, Darlington, red, **Rose Blossom**, y., 2 m., 2 w., 1 d., bred by S. Campbell, Totthills, Kintore, N.B.; s., *Van der Bine* (60,495); d., Roselint; s. of d., Gravesend (46,461).

CLASS 53.—Shorthorn Cows, in-Milk or in-Calf, calved before 1895. [2 entries.]

These cows were shown at the Local Committee, and confined to residents in South Wales or Monmouthshire.)

I.—J. D. WILLIS, Langford House, Langford, Bristol, red and white, **Flora**, 7 y., 3 m., 2 w., 5 d.; s., Jupiter (57,508); d., Fancy Girl (58,304); s. of d., Bellerophon (47,472); and **Lady Gold**, 8 y., 5 m., 11 d.; s., *Van der Bine* (60,495); d., Lady Grey 5th; s. of d., Bellerophon (47,472).

R.—**R. THOMAS**, Boverton Place, Cowbridge, roan, **Bright Gem**, 7 y., 0 m., 3 w., 4 d., bred by Marquis of Bute, Cardiff Castle, Cardiff; s., Lord Granville (64,375); d., Waste Water 3rd; s. of d., Prince Waterlow 4th (48,531); and **Star 12th**, 5 y., 3 m., 3 w., 2 d.; s., Major Booth (57,725); s., **Star 8th**; s. of d., Duke of Hodge Beck (52,762).

CLASS 54.—Shorthorn Heifer, in-Milk or in-Calf, calved in 1895.
[6 entries.]

I. (£10.)—**G. HARRISON**, Gainford Hall, Darlington, roan, **Welcome**, 1 y., 7 m., 3 w., 4 d.; s., Champion Cup (65,240); d., Warfare; s. of d., First Consul (57,314).

II. (£5.)—**J. D. WILLIS**, Bapton Manor, Codford, Wilts, roan, **Bapton Daisy**, 3 y., 2 m., 3 w., 1 d.; s., Adolphus; d., Wilts Daisy; s. of d., Rising Star.

III. (£2.)—**L. DE ROTHSCHILD**, Ascott Home Farm, Leighton Buzzard, roan, **Sittyton Bride**, 3 y., 4 m., 2 w.; s., Sittyton Pride (67,939); d., Flora 2nd; s. of d., Challenge Cup (57,092).

R.—**P. L. MILLS**, Ruddington Hall, Nottingham, roan, **Royal Butterfly Duchess 8th**, 3 y., 2 m.; s., Master of the Ceremonies (56,162); d., Royal Butterfly Duchess 7th; s. of d., Baron Oxford 3rd (42,737).

CLASS 55.—Pure Shorthorn Cow or Heifer, in-Milk, eligible for Coate's Herd Book, subject to special condition 58 stated in Prize Schedule. [1 entry.]

(The Prize was given by the Shorthorn Dairy Prize Fund Committee.)

I. (£10.)—**G. F. KING**, Chewton Keynsham, red, **Countess 40th**, 1 y., 4 m., 3 w.; s., Vain Knight (66,541); d., Countess 8th; s. of d., Lord Somerset 8th (48,247).

CLASS 56.—Shorthorn Heifer, calved in 1896. [6 entries.]

I. (£10.)—**J. D. WILLIS**, Bapton Manor, Codford, Wilts, roan, **Bapton Vanity**, 1 y., 9 m., 3 w., 4 d.; s., Count Lavender; d., Vain Girl; s. of d., Golden Crown.

II. (£5.)—**L. DE ROTHSCHILD**, Ascott Home Farm, Leighton Buzzard, roan, **Mayflower 4th**, 2 y., 4 m., 2 w.; s., President (67,611); d., Mayflower; s. of d., Eastern Star (58,881).

III. (£2.)—**S. HILL**, J.P., Langford House, Langford, near Bristol, roan, **Evelyn 2nd**, 1 y., 5 m., 3 w., 5 d., bred by G. F. King, Elm Farm, Chewton Keynsham; s., Heart of Oak (68,765); d., Evelyn; s. of d., Beau Ideal (63,685).

R.—**Mrs. M. LEWIS**, Clynfieu, Boncath, R.S.O., roan, **Margery Millicent**, 1 y., 5 m., 2 w., 6 d.; s., Isthmain (67,223); d., Marionette Millicent (vol. iii. p. 492); s. of d., British Beau (58,560).

CLASS 57.—Shorthorn Heifer, calved in 1897. [6 entries.]

I. (£7.)—**G. HARRISON**, Gainford Hall, Darlington, roan, **Fairy Queen**, 1 y., 4 m., 3 w., 1 d.; s., Champion Cup (65,240); d., Fern 7th; s. of d., Donald (52,725).

II. (£5.)—**J. D. WILLIS**, Bapton Manor, Codford, Wilts, 1 y., 3 m., 1 w.; s., Count Lavender; d., Wilts Daisy; s. of d., Rising Star.

VOL. IX.—F. S.

III. (£2.)—L. DE ROTHSCHILD, Ascott Home Farm, Leighton Buzzard, red. and white, **President Bride**, 1 y., 4 m., 1 w.; s., President (67,611); d., Flora 2nd; s. of d., Challenge Cup (57,092).

R.—R. W. HUDSON, Danesfield, Marlow, Bucks, white, **Pearl**, 1 y., 3 m., 5 d., bred by W. Bond, Wargrave, Henley-on-Thames; s., Blair Athol (60,367); d., Rosedale Dennison; s. of d., Private Secretary (54,871).

CLASS 58.—*Shorthorn Heifer under three years old.* [3 entries.]

(Given by the Cardiff Local Committee, and confined to residents in South Wales or Monmouthshire.)

I. (£5.)—LORD TREDEGAR, Tredegar Park, near Newport, Mon., roan, **Lady of the Valley**, 2 y., 6 m., 3 w.; s., Lord of the Valley 2nd (65,840); d., Blossom 12th; s. of d., Comet 4th (62,313).

II. (£3.)—R. THOMAS, Boverton Place, Cowbridge, roan, **Rose of Boverton**, 2 y., 10 m., 3 w., 6 d.; s., Madallion (56,175); d., Victoria; s. of d., Pilot (51,837).

R.—R. THOMAS, roan, **Rosy Murnhull 4th**, 2 y., 2 w., 3 d.; s., Iron Master; d., Rosy Murnhull; s. of d., Lord Dunville (59,303).

HEREFORD.

CLASS 59.—*Hereford Bull, calved in 1894 or 1895.* [3 entries.]

I. (£15.)—E. WIGHT, Tedstone Court, Herefordshire, **Tedstone President** (18,631), 3 y., 3 m., bred by Sir C. R. Boughton, Bart., Downton Hall, Ludlow; s., Royalist 3rd (16,958); d., Cora (vol. xxiv. p. 204); s. of d., Sovereign (12,688).

II. (£10.)—A. E. HILL and E. J. LEWIS, Eggleton Court, Ledbury, **Newdigate**, 3 y., 4 m., bred by J. H. Arkwright, Hampton Court, Leominster; s., Pearl Cross; d., Lively 18th; s. of d., Hilarity.

CLASS 60.—*Hereford Bull, calved in 1896.* [5 entries.]

I. (£15.)—R. EDWARDS, Strangworth, Pembridge, Herefordshire, **Liberty** (18,919), 2 y., 1 m., 3 w., 5 d.; s., Royal Marquis (18,069); d., Lady Cow 11th; s. of d., Montrose (10,324).

II. (£10.)—D. EVANS, Ffrwdgrech, Brecon, **Prince of Orange**, 2 y., 4 m., 4 d., bred by J. H. Arkwright, Hampton Court, Leominster, Herefordshire; s., Prince Bulbo (17,442); d., Lemon 6th (vol. xxv. p. 665, H.H.B.); s. of d., Post Obit (11,542).

CLASS 61.—*Hereford Bull, calved in 1897.* [13 entries.]

I. (£10.)—J. H. ARKWRIGHT, Hampton Court, Leominster, Herefordshire, **All England**, 1 y., 4 m., 3 d.; s., Albion (15,027); d., Pearl 11th (vol. xxviii. p. 167); s. of d., Rose Cross 2nd (14,865).

II. (£5.)—A. E. HUGHES, Wintercott, Leominster, **Protector**, 1 y., 4 m., 3 d.; s., Albion (15,027); d., Newtown Plum; s. of d., Rudolph (6660).

III. (£2.)—R. GREEN, The Whittern, Lyonshall, Herefordshire, **Malmesbury**, 1 y., 4 m., 6 d.; s., Overseer (16,249); d., Merry Maid; s. of d., Whittern Grove (10,843).

R.—J. TUDGE, Duxmoor, Craven Arms, Salop, **Ludlow**, 1 y., 2 m., 1 w., 1 d.; s., Lord Fulham (13,937); d., Pembridge 7th; s. of d., Graceful (12,177).

V. H. C.—R. KEENE, Llanvihangel Court, Chepstow, **Rodney Stone**, 1 y., 4 m., 3 w., 2 d.; s., Romance (17,483); d., Fan Bangham; s. of d., Bangham (6793).

H. C.—EARL OF COVENTRY, Croome Court, Worcester, **Primate**, 1 y., 4 m., 4 d.; s., Monitor (17,974); d., Primrose 2nd; s. of d., Royal Ruler (13,406):—and for his **Rare Boy**, 1 y., 3 m., 1 w., 2 d.; s., Monitor (17,974); d., Rare Peri 3rd; s. of d. Senator (14,896):—and J. PRICE, Court House, Pembridge, Hereford, **Douglas**, 1 y., 4 m., 1 w., 1 d.; s., Jubilee 2nd (13,898); d., Dinah; s. of d., Boniface (9600).

CLASS 62.—Hereford Cow, in-Milk or in-Calf, calved before 1895.

[4 entries.]

I. (£15).—S. H. ARMITAGE, Upper Newton, Kinnersley, Letton, R.S.O., **Pimpernell**, 4 y., 1 m., 2 w., 3 d., bred by Col. R. Bridgeford, C.B., Beech Lawn, Whalley Range, Manchester; s., Ardcaru (16,516); d., Peony; s. of d., Torro (7313).

II. (£10).—R. D. CLEASBY, Penoyre, Brecon, **Miss Mary 2nd**, 4 y., 4 m., 3 w., 2 d.; s., Overseer (16,249); d., Miss Mary; s. of d., Bear (10,974).

III. (£5).—D. EVANS, Ffrwdgrech, Brecon, **Beauty**, 10 y., 4 w.; s., Miller (14,725); d., Dark Beauty (vol. xxi. p. 327, H.H.B.); s. of d., Rothschild (8000).

CLASS 63.—Pair of Hereford Cows, in-Milk or in-Calf, calved before 1895. [2 entries.]

(Given by the Cardiff Local Committee, and confined to residents in South Wales or Monmouthshire.)

I. (£8).—W. THOMAS, The Hayes, Sully, Penarth, **Ringdove 4th** and **Governess**, 5 y., 3 m., 2 d., and 4 y., 11 m., 2 w.; s., Standard (14,194); s., Ringdove and Countess 7th; s. of d., Columbus (9731) and County Member (6372).

II. (£4).—T. GEORGE, The Deri, Whitchurch, Cardiff, 3 y., 11 m., and 3 y., 10 m.; s., John Bull (vol. xxiv.); ds., Buttercup and Cowslip; s. of d., Easter (vol. xix.).

CLASS 64.—Hereford Heifer, in-Milk or in-Calf, calved in 1895.

[4 entries.]

I. (£10).—R. GREEN, The Whittern, Lyonshall, Herefordshire, **Cedar**, 3 y., 1 m., 3 w., 4 d.; s., Pioneer (16,269); d., Corn Flower; s. of d., Whittern Grove (10,843).

II. (£5).—J. TUDGE, Duxmoor, Craven Arms, Salop, **Little Lady**, 2 y., 10 m., 3 w., 3 d.; s., Rupert (16,366); d., Pembridge 7th; s. of d., Graceful (12,177).

III. (£2).—D. EVANS, Ffrwdgrech, Brecon, **Pretty Tulip 2nd**, 2 y., 1 m., 1 w., 4 d.; s., Blucher 2nd (18,246); d., Lady 11th (vol. xxii. p. 613, I.H.B.); s. of d., Conqueror (5264).

CLASS 65.—Hereford Heifer, calved in 1896. [3 entries.]

I. (£10).—A. E. HUGHES, Wintercott, Leominster, **Wintercott Plum**, 3 y., 3 m., 3 w., 5 d.; s., Albion (15,027); d., Newtown Plum; s. of d., Adolph (6660).

II. (£5).—R. GREEN, The Whittern, Lyonshall, Herefordshire, **Iria**, 2 y., 3 m., 3 w., 5 d.; s., Gentle Boy (16,074); d., Ivy; s. of d., Druid (5880).

III. (£2).—J. H. ARKWRIGHT, Hampton Court, Leominster, Herefordshire, **Lively 27th** (vol. xxviii. p. 167), 1 y., 11 m., 2 w., 1 d.; s., Pearl Cross (16,882); d., Lively 10th (vol. xxvi. p. 171); s. of d., Conjuror (5264).

CLASS 66.—Hereford Heifer, calved in 1897. [8 entries.]

I. (£7).—A. E. HUGHES, Wintercott, Leominster, **Ladylove**, 1 y., 4 m., 1 w., 4 d.; s., Albion (15,027); d., Lofty 2nd; s. of d., Seabreeze (14,153).

II. (£5).—R. KEENE, Ilanvihangel Court, Chepstow, **Fancibel**, 1 y., 4 m., 3 w., 1 d.; s., Romance (17,483); d., Fantastic; s. of d., Pembridge (10,387).

III. (£2).—R. D. CLEASBY, Penoyre, Brecon, **Miss Molly**, 1 y., 4 m., 3 w., 1 d.; s., Black Test (17,624); d., Miss Mary 2nd; s. of d., Overseer (16,249).

R.—R. GREEN, The Whittern, Lyonshall, Herefordshire, **Raphia**, 1 y., 3 m., 2 w.; s., Prince Richard (17,450); d., Rachel; s. of d., Cleveland (13,696).

H. C.—J. TUDGE, Duxmoor, Craven Arms, Salop, **Wilton Star**, 1 y., 2 m., 1 w.; s., Forest King (18,364); d., Wilton Lass; s. of d., Launcelot (13,917);—and for his **Lady Duxmoor**, 1 y., 2 m., 1 w., 6 d.; s., Lord Fulham (13,937); d., Rubella; s. of d., Hartington (5358).

C.—R. GREEN, **Prunella**, 1 y., 4 m., 3 w., 1 d.; s., Overseer (16,249); d., Prudence; s. of d., Whittern Grove (10,843).

CLASS 67.—Hereford Heifer, under three years old. [3 entries.]

[No EXHIBIT.]

(Offered by the Cardiff Local Committee, and confined to residents in South Wales or Monmouthshire.)

SUSSEX.

CLASS 68.—Sussex Bull, calved in 1894 or 1895. [1 entry.]

I. (£15).—EARL OF DERBY, Birtley, Witley, Surrey, **Gamecock** (1414), 3 y., 4 m., 3 w., 1 d.; s., Lord Oxeye of Wantley (1070); d., Gladstone 3rd (4008); s. of d., Oxford 2nd (771).

CLASS 69.—Sussex Bull, calved in 1896 or 1897. [5 entries.]

A. (£15).—EARL OF DERBY, Birtley, Witley, Surrey, **Merchant** (1485), 11 m., 2 w., 5 d.; s., Golden Rex (1303); d., Merry May (5804); s. of d., Billy Boy Blue (1081).

I. (£10).—Miss E. S. WOLFE, Crowborough, Sussex, **Goldlink of Horsham 2nd** (1465), 2 y., 3 m., bred by A. Agate, Horsham, Sussex; s., Goldlink (1099); d., Longley 3rd (5335); s. of d., Lord Oxeye (954).

A. & H. C.—P. F. R. SAILLARD, Buchan Hill, Crawley, **Beubush 2nd**, 11 m., 20 d.; s., Lord Oxeye 2nd (1383); d., Cherry Tart (5662); s. of d., Saracen (1032).

J.—H. PARTRIDGE, Bletchingley, **Bletchingley 1st** (1499), 2 y., 4 m., 1 w., 1 d., bred by C. J. Lucas, Horsham; s., Lord Oxeye 2nd (1383); d.,

aisy of Warnham (6603); s. of d., Lord John (924):—and P. F. R. SAILLARD, **Buccaneer** (S.H.B., entered 1898), 1 y., 8 m., 3 w.; s., Lord Oxeys (1383); d., Constance (3015); s. of d., Berry (259).

CLASS 70.—Sussex Cow or Heifer, in-Milk or in-Calf, calved before 1896. [4 entries.]

I. (£15.)—EARL OF DERBY, Birtley, Witley, Surrey, **Carnation** (6495), 1 y., 2 w., 2 d.; s., Gladiator (1171); d., Cuckoo (5462); s. of d., Frank (997).

II. (£10.)—P. F. R. SAILLARD, Buchan Hill, Sussex, **Elsa 2nd** (5732), 5 y., 11 m., 4 d., bred by the late W. B. Waterlow, Hightrees, Reigate; s., Knight of Woodmancote 3rd (966); d., Elsa (3214); s. of d., Wallace (478).

R. & H. C.—Major M. G. BEST, Park House, Boxley, Maidstone, **Boxley Oakleaf** (6745), 3 y., 2 m., 3 w., 5 d.; s., Marechal Niel (1180); d., Oakleaf (5364); s. of d., Oxford Duke 1st (840).

CLASS 71.—Sussex Heifer, calved in 1896. [6 entries.]

I. (£10.)—F. WARDE, Aldon, Addington, West Malling, Kent, **Aldon Wilderness 1st** (7196), 2 y., 4 m., 3 w.; s., Headley (1201); d., Aldon Wilderness (6059); s. of d., Walnut.

II. (£5.)—H. PARTRIDGE, Castle Hill, Bletchingley, **Gretchen**, 2 y., 4 m., 6 d., bred by E. Braby, Drungewick, Rudgwick; s., Noble Johnnie (1360); d., Geraldine (3733); s. of d., Eastbourne (539).

III. (£2.)—EARL OF DERBY, Birtley, Witley, Surrey, **Necklace**, 1 y., 7 m., 2 d.; s., Gladsome Prince (1370); d., Noblesse (3078); s. of d., Drungewick (456).

R. & H. C.—P. F. R. SAILLARD, Buchan Hill, Crawley, **Bewbush May** (7182), 2 y., 2 m., 3 w., 6 d.; s., Silversmith 2nd (1115); d., Old Mayflower 4th (3082); s. of d., Shirley (436).

H. C.—Major M. G. BEST, Park House, Boxley, Maidstone, **Boxley Grasshopper** (7019), 2 y., 3 m., 3 w., 5 d.; s., Marechal Niel (1180); d., Grandiflora (4627); s. of d., Frankfort 1st (811).

C.—P. F. R. SAILLARD, **Lady Napier 7th** (6996), 2 y., 4 m., 2 w., bred A. Agate, Grandford House, Horsham; s., Goldlink (1099); d., Lady Napier 3rd (5628); s. of d., Lord John (934).

CLASS 72.—Sussex Heifer, calved in 1897. [6 entries.]

I. (£7.)—F. WARDE, Aldon, Addington, West Malling, Kent, **Aldon Jewel**, 1 y., 4 m., 3 w.; s., Aldon 1st (1450); d., Aldon Prebble A5 (6055); s. of d., Stella's Oxford (651).

II. (£5.)—EARL OF DERBY, Birtley, Witley, Surrey, **Bangle** (7343), 1 y., 3 m., 3 w.; s., Golden Rex (1303); d., Broad Bess (5032); s. of d., Court Wick (801).

III. (£2.)—F. WARDE, **Aldon Pride**, 1 y., 4 m., 3 w.; s., Goldfinch (1277); d., Aldon Cherry (6042); s. of d., Duke of Dorset (582).

R. & H. C.—P. F. R. SAILLARD, Buchan Hill, Crawley, **Muriel**, 1 y., 1 m., 3 d., bred by J. H. T. Broadwood, Lyne, Horsham; s., Lord of Ifold (1406); d., Goldust Stormy (6407); s. of d., Goldust 11th (677).

C.—H. PARTRIDGE, Castle Hill, Bletchingley, **Sunflower**, 1 y., 3 m., 2 w., 5 d., bred by W. Wood, Field, Crawley; s., Young Goldfinch (1888); d., Flower 3rd (7248); s. of d., Clifton (1235):—and P. F. R. SAILLARD, **Alicia**, 11 m., 20 d.; s., Saracen 2nd (1445); d., Mary Fern of Clinfold (4871); s. of d., Buffer (663).

ABERDEEN-ANGUS.

CLASS 73.—*Aberdeen-Angus Bull, calved in 1895, 1896, or 1897.*

[3 entries.]

I. (£7.)—L. A. MACPHERSON, Wyrley Grove, Pelsall, Staffs, black, **Lord Forward** (14,602), 1 y., 4 m., 3 w., 4 d., bred by Sir Geo. Macpherson Grant, Ballindalloch; s., Prospero (11,208); d., Lady Flame (21,823); s. of d., Eurotas (9962).

R.—R. THOMAS, Boverton Place, Cowbridge, black, **Duke**, 1 y., 4 m., 2 w., 6 d.; s., Kidnapper; d., Rosabella of Pitpomtee, s. of d., Hector of Pitpomtee (10,049).

CLASS 74.—*Aberdeen-Angus Cow or Heifer, in-Milk or in-Calf, calved before 1896.* [2 entries.]

[No EXHIBIT.]

CLASS 75.—*Aberdeen-Angus Heifer, calved in 1896 or 1897.*

[3 entries.]

I. (£7.)—L. A. MACPHERSON, Wyrley Grove, Pelsall, Staffs, black, **Potpourri** (26,193), 1 y., 5 m., 1 w., 6 d., bred by the Earl of Strathmore, Glamis Castle, Forfarshire; s., Reubens 8th (12,065); d., Pride of Powrie 5th (19,819); s. of d., Norfolk 5th (7022).

R.—L. A. MACPHERSON, **Dainty Nosegay** (26,023), 1 y., 5 m., 1 w., bred by the Countess Dowager of Seafield, Cullen House, Cullen; s., Earl of Findlater (12,434); d., Cullen Nosegay (21,002); s. of d., Faultless (7531).

BLACK WELSH.

CLASS 76.—*Black Welsh Bull, calved in 1894 or 1895.* [3 entries.]

I. (£10.)—R. M. GREAVES, Wern, Portmadoc, Carnarvonshire, **Bryntwr**, 7., 4 m., 2 w., 1 d.; s., Ulundi (238); d., Gwernen Ddu (888); s. of d., Sir 2nd (126).

20. J. DAVIES, Llamaston Farm, Pembroke, South Wales, **Betty**, 3 y., 1 m., bred by — Griffiths, Penally Court, Penally; s., Vic 1 Blodwen.

21. V. E. OAKELEY, The Plas, Tan-y-Bwlch, North Wales, **Hwfa**, 3 y., 2 w., 4 v., 6 d.; s., Ewen (341) by Rhaiadr Du (257); d., Mair 4th (969); s. of d., Lotima (125).

22. J. and W. OWEN, Haid Farm, Llanboidy, Whitland, Carmarthenshire, **Gleidr**, 2 y., 2 m., 3 w., bred by W. E. Oakeley, The Plas, Tan-y-Bwlch, Merionethshire; s., Little Orme (369); d., Bensyth 4th (559); s. of d., Lp-c 1st (70).

II. (£5.)—W. E. OAKELEY, The Plas, Tan-y-Bwlch, N. Wales, **Cawr**, y., 2 m., 1 w., 1 d.; s., Morfa Bychan (312); d., Mair 4th (969); s. of d., Latimer (188).

R.—R. M. GREAVES, Wern, Portmadoc, Carnarvonshire, **Bog Bean**, 2 y., w., 1 d.; s., Bog Bear (340); d., Llefrith 3rd (1018); s. of d., Llywarch-o-adryn (263).

CLASS 78.—Black Welsh Bull, calved in 1897. [2 entries.]

I. (£7.)—R. M. GREAVES, Wern, Portmadoc, Carnarvonshire, **Madoc** boy, 11 m., 1 d.; s., Madoc Lad (311); d., Royal Windsor 2nd (1035); s. of d., William Pennant (264).

R.—W. E. OAKELEY, The Plas, Tan-y-Bwlch, North Wales, **Bran**, 1 y., m., 3 w., 1 d.; s., Morfa Bychan (312); d., Linsey Woolsey (967); s. of d., Ardudwy (255).

CLASS 79.—Black Welsh Cow, in-Milk or in-Calf, calved before 1895. [1 entry.]

I. (£10.)—W. E. OAKELEY, The Plas, Tan-y-Bwlch, North Wales, **Mair** 4th (969), 6 y., 4 m., 3 w., 1 d.; s., Latimer (188); d., Mair 3rd (740); s. of d., Harlech (96).

CLASS 80.—Black Welsh Heifer, in-Milk or in-Calf, calved in 1895. [1 entry.]

I. (£10.)—R. M. GREAVES, Wern, Portmadoc, Carnarvonshire, **Fynon** Beuno, 3 y., 4 m., 3 w., 1 d.; s., St. Beuno (316); d., Allt Ddu (704), s. of d., Iutto Ddu (165).

CLASS 81.—Black Welsh Heifer, calved in 1896. [4 entries.]

I. (£7.)—W. E. OAKELEY, The Plas, Tan-y-Bwlch, North Wales, **Tee**-wynisa, 2 y., 4 m., 3 w., 2 d.; s., Llandecwyn (343); d., Dinah Oakeley (962); s. of d., Rhaiadr Du (257).

II. (£5.)—R. M. GREAVES, Wern, Portmadoc, Carnarvonshire, **Minx**, y., 4 m., 3 w.; s., Bounce (308); d., Bloden Ddu (884); s. of d., Tywytog Du (177).

R.—O. L. DAVIES, Typicca, Golden Grove, **Duchess**, 2 y., 1 w., 3 d.; s., Robin Ddu 2nd; d., Queen.

H. C.—O. L. DAVIES, **Empress**, 2 y., 3 m., 5 d.; s., Robin Ddu 2nd; d., Kelly.

CLASS 82.—Black Welsh Heifer, calved in 1897. [4 entries.]

I. (£7.)—R. M. GREAVES, Wern, Portmadoc, Carnarvonshire, **Tremadoc**, y., 4 m., 3 w., 1 d.; s., Madoc Lad (311); d., Treflys.

II. (£5.)—J. and W. OWEN, Hafod Farm, Llanboidy, Whitland, Carmarhenshire, **Blodwen**, 1 y., 2 m., 3 w.; s., Prince George; d., Tulip; s. of d., London Tom.

R.—O. L. DAVIES, Typicca, Golden Grove, **Blodwen**, 1 y., 1 m., 2 w., 1 d.; s., Robin Ddu 2nd; d., Beauty.

H. C.—R. M. GREAVES, **Winter Queen**, 1 y., 3 m., 4 w.; s., Bounce (308); d., May Queen (890); s. of d., Sir Roger (315).

JERSEY.**CLASS 83.—Jersey Bull, calved in 1894 or 1895. [3 entries.]**

I. (£15).—**LORD ROTHSCHILD**, Tring Park, Tring, Herts, dark fawn, **Alicante's Boy**, 2 y., 8 m., 1 w., 5 d.; s., Flora's Lad (4098); d., Alicante (Imp. vol. vii. p. 175); s. of d., Count Wolseley (3191).

II. (£10).—**DUKE OF MARLBOROUGH**, Blenheim Palace, Woodstock, Oxon, black, **Danger Signal** (5519), 3 y., 3 w., 1 d., bred by Lord Rothschild; s., Blackwood (4486); d., Red Light (vol. vi. p. 504).

R.—J. H. SHORE, Whatley House, near Frome, fawn, **Golden Bute** (2134 H.C., P.S.), 4 y., 1 m., 2 w., bred by T. Mourant, Trinity, Jersey; s., Golden Pink (1491 H.C., P.S.); d., Butes Sultane 4th (4194 P.S.); s. of d., Carlo's Pink (1186, P.S.).

CLASS 84.—Jersey Bull, calved in 1896. [5 entries.]

I. (£15).—**H. MCCALMONT**, M.P., Bishopswood, Ross, whole, **Rome**, 1 y., 11 m., 2 w., 4 d.; s., Caligula (4497); d., Science 2nd (vol. vi. p. 545); s. of d., Golden Lad (3324).

II. (£10).—**Sir J. BLYTH**, Bart., Blythwood, Stansted, Essex, grey, **Crown Prince**, 1 y., 6 m., bred by J. S. Arthur, St. Mary's, Jersey; s., Golden Pasha (2154, I.H.B.); d., Silver Crown 4th (5234, I.H.B.).

R. & H. C.—**Mr. H. R. PEEI**, Byletts, Pembridge, Herefordshire, whole grey fawn, **Harry Butterwick**, 2 y., 1 w., 2 d., bred by Mrs. A. F. Perkins, Oak Dene, Holmwood, Surrey; s., Harry Lynx (4171); d., Mrs. Butterwick; s. of d., King Ethelred (4214).

C.—**LADY MATHER-JACKSON**, Llantillio Court, Abergavenny, whole, **Stray Shot**, 1 y., 11 m., 3 w., 1 d., bred by H. McCalmont, M.P.; s., Distinction's Security (vol. vi. p. 324); d., Brown Bess 4th (vol. vi. p. 76); s. of d., King of the Isles (3441).

CLASS 85.—Jersey Bull, calved in 1897. [15 entries.]

I. (£10).—**H. MCCALMONT**, M.P., Bishopswood, Ross, whole, **Censor**, 1 y., 1 m., 3 d.; s., Havering Bismarck (5588); d., Wigton 6th (vol. vi. p. 630); s. of d., Flora's Lad (4098).

II. (£5).—**Miss GREENALL**, Walton Hall, Warrington, black brown, **Golden Monarch**, 1 y., 4 m., 2 w., 4 d., bred by J. Driland, Trinity, Jersey; s., Golden Lad 2nd (2023); d., Agenosia 3rd (4125).

III. (£2).—**Mrs. C. MCINTOSH**, Havering Park, Essex, dark fawn, **Havering Butterboy** (E.J.H.B.), 1 y., 2 w., 5 d.; s., Mont Pellier (5294, E.J.H.B.); d., Golden Buttercup 2nd (vol. vii. p. 202); s. of d., Multon 4028, J.H.B.).

R. & V. H. C.—**Mrs. C. MCINTOSH**, dark grey, **Victor**, 1 y., 3 m., 1 d., bred by P. Lucas, St. Martin's, Jersey; s., Actor (2256, J.H.B.); d., Maralia 4221, J.H.B.); s. of d., Islander (1181, J.H.B., H.C.).

H. C.—**LORD ROTHSCHILD**, Tring Park, Tring, Herts, bronze fawn, **molite**, 1 y., 3 m., 3 w., 6 d.; s., Oxford Prince (4959); d., Carmola 2nd (vol. vi. p. 92); s. of d., Happy Jack (4871).

H. C.—**LORD ROTHSCHILD**, broken light fawn, white on shoulders, and under breast, **What's Wanted**, 1 y., 3 m., 2 d.; s., Oxford Duke (5314); 1., Wigton 2nd (vol. v. p. 750); s. of d., Count Wolseley (3191).

C.—**W. MCKENZIE BRADLEY**, Leylands, Meopham, Kent, whole, **Speculator**, 1 y., 1 m., 3 d.; s., Prince of Beresford (5342); d., Speculation; s. of d., Admiral Nelson:—and **Mrs. W. BARRON**, Taplow House, Bucks, fawn, **Lord of the Isles 2nd**, 1 y., 1 w., 3 d., bred by the late W. Barron; s., Champion Fuss (5498); d. Lady of the Lake 6th (vol. vii. p. 9); s. of d., Dora's Champion (5142).

CLASS 86.—Jersey Cow, in-Milk or in-Calf, calved before 1895.
[22 entries.]

I. (£15.)—**LORD ROTHSCHILD**, Tring Park, Herts, fawn, **Dairy's Golden**, 6 y., 5 m., 2 w., 6 d., bred by W. J. Labey, Grouville, Jersey; s., Golden Lad (3324); d., Darkey's Dairy Pride.

II. (£10.)—**Sir J. BLYTH**, Bart., Blythwood, Stansted, Essex, fawn, **Tenby**, 7 y., 3 w., 3 d., bred by J. Touzel, Jersey; s., Golden Lad (1242, I.H.B.); d., Texas (2205, I.H.B.).

III. (£5.)—**Miss GREENALL**, Walton Hall, Warrington, brown, **Sweet Eyes** (4935, vol. vii. p. 233), 6 y., 6 m., bred by W. Jeans, Trinity, Jersey; s., Golden Lad (1242); d., Fidélite's Beauty (7499).

R. & V. H. C.—**Miss GREENALL**, fawn, **Daisy of the Valley** (vol. vi. p. 147), 8 y., 3 m., 6 d., bred by J. C. Le Sueur, St. Saviour's, Jersey; s., Count Wolseley (928); d., Beauty of Ogden (3563).

V. H. C.—**Sir J. BLYTH**, Bart., grey, **Snowflake 4th**, 10 y., bred by J. C. Le Sueur; s., Everton King (1565); d., Snowflake (714, I.H.B.):—**W. B. RODERICK**, Fronheulog, Llanelly, South Wales, fawn, **Surville's Pride**, 6 y., 10 m., 2 w., 1 d., bred by T. de Gruchy, Jersey; s., Oleander; d., Primrose:—and **LORD ROTHSCHILD**, mulberry, **Ellen 2nd**, 4 y., 1 m., 5 d., bred by — Corbett, Betchworth, Surrey; s., Butterboy (4786); d., Emily K. K.; s. of d., Dog Rose (4063).

H. C.—**W. MCKENZIE BRADLEY**, Leylands, Meopham, Kent, whole, **Gauntlet**, 5 y., 1 m., 3 w., bred by F. H. L. Boutillier, St. Owen's, Jersey; s., Golden Lad (3324); d., Comtesse (2464); s. of d., Rosebery (584):—**A. GIBBS**, Tyntesfield, Bristol, fawn, **Buttercup 3rd**, 6 y., 1 m., 2 d.; s., Sir Peter (5394); d., Buttercup; s. of d., Gordon (5190):—and **Mrs. W. BARRON**, Taplow House, Bucks, fawn, **Lady Tidy 3rd** (vol. vi. p. 326), 4 y., 2 m., 4 d., bred by the late W. Barron; s., Lord of the Isles (4612); d., Lady Tidy (vol. v. p. 715); s. of d., Sir Joe (3799).

C.—**H. McCALMONT**, M.P., Bishopswood, Ross, whole fawn, **Miss Angot 4th**, 3 y., 6 m., 3 w., bred by J. Priault, St. Owen's Jersey; s., Golden Lad (3324); d., Miss Angot (1242, F.S.):—and **W. B. RODERICK**, fawn, **Marchande**, 4 y., 4 m., 3 w., 6 d., bred by P. Lucas, St. Martin's, Jersey; s., Una's Boy (5042); d., Beau Resultat 4th; s. of d., Topsy's Lad (4417).

CLASS 87.—Jersey Heifer, in-Milk or in-Calf, calved in 1895.
[15 entries.]

I. (£10.)—**Mrs. C. MCINTOSH**, Havering Park, Essex, brown, **Snap Buttercup 3rd** (J.H.B.), 3 y., 4 m., bred by W. Alexander, jun., St. Mary's, Jersey; s., Rob Roy (1479, J.H.B.); d., Snap Buttercup 2nd (3383, J.H.B.); s. of d., Duc de Chambord (580, J.H.B.).

II. (£5.)—**DUKE OF MARLBOROUGH**, Blenheim Palace, Woodstock, Oxon, dark fawn, **Hope** (vol. ix.), 3 y., 4 m., 3 w., 4 d., bred by J. P. Hacqual, St. Owen's, Jersey; s., La Chasse Prince (1972); d., Lucy Templar (4938).

III. (£2).—H. McCALMONT, M.P., Bishopswood, Ross, whole fawn, **Faux Pas**, 3 y., 2 m., 4 d.; s., **Orange Peel** (4702); d., **Scarsdale Florida** (vol. v. p. 664); s. of d., **Marmalade** (3515).

R. & V. H. C.—H. McCALMONT, M.P., whole, **Brownny's Dove 3rd**, 3 y., 4 m., 2 d., bred by J. Picot, Trinity, Jersey; s., **Granny's Golden King** (1867, F.S.); d., **Brownny's Dove 2nd** (5026).

H. C.—Miss GREENALL, Walton Hall, Warrington, fawn, **Queen Bee**, 3 y., 2 m., 2 w., 3 d., bred by A. Jouanne, Trinity, Jersey; s., **Valial** (1928); d., **Berne** (7568):—and for her fawn, **Agate**, 3 y., 3 w., 6 d., bred by Sir G. Greenall, Bart.; s., **Little Gem** (1828, 4607); d., **Longueville Brownie** (4323); s. of d., **Trial** (1187).

C.—FOWLER and DE LA PÉRRELLE, Southampton, brown, **Pansy** (fol. 3, J.H.B.), 3 y., 2 m., bred by M. Le Brocq, Jersey; s., **King Nestor** (1951, J.H.B.); d., **La Palme 2nd** (2840, J.H.B.):—and Miss GREENALL, fawn and white, **Lottie** (6573), 3 y., 3 m., 3 w., 5 d., bred by M. Le Ruey, St. Owen's, Jersey; s., **La Chasse Prince** (1927); d., **Syren** (2596).

CLASS 88.—Jersey Heifer, calved in 1896. [18 entries.]

I. (£10).—Mrs. C. McINTOSH, Havering Park, Essex, brown, **Starlight** (J.H.B.), 2 y., 4 m., 4 d., bred by W. Alexander, jun., St. Mary's, Jersey; s., **Hackbeam** (1958, J.H.B., H.C.); d., **Murcia** (3744, J.H.B.); s. of d., **Leonidas** (881, H.C., J.H.B.).

II. (£5).—H. McCALMONT, M.P., Bishopswood, Ross, whole fawn, **Orange Lily**, calved February 20th, 1896, bred by J. de la Haye, St. Saviour's, Jersey; s., **Cato 2nd** (1954); d., **Orange Peel** (3194).

III. (£2).—LORD ROTHSCHILD, Tring Park, Herts, dark fawn, **Tulip 7th** (Reg. vol. viii. p. 29), 2 y., 1 m., 4 w.; s., **Spot's Lad** (4389); d., **Tulip** (vol. v. p. 723); s. of d., **Sultan's Favourite** (3841).

R. & V. H. C.—LORD ROTHSCHILD, fawn, **Oxford Violet**, 2 y., 4 m., 5 d.; s., **Cicero** (4796); d., **Oxford Daffodil** (vol. v. p. 450); s. of d., **Nunthorpe** (4648).

V. H. C.—Miss GREENALL, Walton Hall, Warrington, grey brown, **Regalia** (8430), 2 y., bred by J. Le Brocq, St. Brelade, Jersey.

H. C.—Mrs. C. McINTOSH, brown, **Little Daisy** (J.H.B.), 2 y., 2 w., 4 d., bred by W. Alexander, jun.; s., **Lord Chancellor** (2060, J.H.B.); d., **Belle Rosa 3rd** (5623, J.H.B.); s. of d., **Golden Lad** (1242):—and W. B. RODEBICK, Fronheulog, Llanelly, South Wales, fawn, **Beech Lass**, 2 y., 2 m., 3 w., 2 d., bred by J. R. Vautier, Jersey; s., **Robert** (2155); d., **Graphic** (4699).

C.—Miss GREENALL, brown, **Squegee**, 2 y., 4 m., 2 w., 3 d., bred by L. S. Mourant, Jersey; s., **Hope** (1948); d., **Lucie** (5469):—Mrs. W. BARRON, Taplow House, Bucks, fawn, **Lady Tidy 4th** (vol. viii. p. 9), 1 y., 1 m., 1 w., 4 d., bred by the late W. Barron; s., **Dora's Champion** (5142); d., **Lady Tidy 3rd** (vol. vi. p. 236); s. of d., **Lord of the Isles** (4612):—Mrs. H. R. PEEL, Byletts, Pembridge, Herefordshire, fawn, **Shella**, 3 m., 5 d.; s., **Orelia** (4958); d., **Spring**; s. of d., **Orme** (4297):—and Miss STANDISH, Marwell Manor, Eastleigh, Hants, fawn, **Princess Red Fern 2nd**, 2 y., 3 m., 3 w., 6 d., bred by J. Dorey, St. John's, Jersey; s., **Golden King** (4722); d., **Princess Red Fern** (7521).

CLASS 89.—Jersey Heifer, calved in 1897. [21 entries.]

I. (£1).—LORD ROTHSCHILD, Tring Park, Tring, Herts, fawn, **Brown Lass of Carteret**, 1 y., 2 m., 1 w., 6 d.; s., **Oxford Duke** (4814); d., **Brown Duchess of Carteret** (4722); s. of d., **Golden Lad** (3324).

II. (£5.)—H. McCALMONT, M.P., Bishopswood, Ross, fawn, **Harmony**, 11 m., 2 d.; s., Minstrel; d., Monitress (vol. vii. p. 61); s. of d., Mentor (4632).

III. (£2.)—Sir J. BLYTH, Bart., Blythwood, Stansted, Essex, fawn and white, **Oompah's Suzon**, 1 y., 1 m., 3 d.; s., Oompah (2262, I.H.B.); d., Perry Farm Suzon; s. of d., Count Cicero (398, I.H.B.).

R. & V. H. C.—Mrs. W. BARRON, Taplow House, Bucks, fawn, **Lady of the Lake 8th**, 1 y., 1 w., 4 d., bred by the late W. Barron; s., Dora's Champion (5142); d., Lady of the Lake 5th (vol. vi. p. 322); s. of d., Viola's Pride.

H. C.—Miss GREENALL, Walton Hall, Warrington, fawn, **Lady Avenal 3rd**, 10 m., 2 w., 5 d.; s., Golden Glory (5562); d., Lady Avenal 2nd (4644); s. of d., Primrose Boy (1262);—and Mrs. C. McINTOSH, Havering Park, Essex, brown, **Havering Carnatie**, 1 y., 1 m., 4 d.; s., Mont Pellier (5294, E.J.H.B.); d., Carnatie 2nd (5622, J.H.B.); s. of d., Rosebery's Lad (1730, J.H.B.).

C.—Sir J. BLYTH, Bart., fawn, **Oompah's Chance**, 1 y., 2 m.; s., Oompah (2262, I.H.B.); d., Chance Aster 2nd; s. of d., Golden Hero (1833, I.H.B.);—W. McKENZIE BRADLEY, Leylands, Meopham, Kent, broken, **Leyland Melvina**, 11 m., 3 w., 5 d.; s., Grouville's Lad (5197); d., Melvina 3rd (6113); s. of d., Lowland King (4616);—A. GIBBS, Tyntesfield, Bristol, broken, **Hoia 2nd**, 1 y., 4 d., bred by C. C. Tudway, Wells; s., Bijou (5474); d., Hoia; s. of d., Monk (4637);—and for his 9 m., 3 d., bred by C. C. Tudway; s., Marius (5270); d., Le Vaux Beauty (vol. vii. p. 212); s. of d., Cato (4793);—Miss GREENALL, fawn, **Longueville Brownie 5th**, 1 y., 3 m., 2 w., bred by Ph. Arthur, St. Saviour's, Jersey; s., Golden Lad 2nd (2023); d., Longueville Brownie 2nd (5463);—LORD ROTHSCHILD, broken light fawn, white on left thigh, **Jewel**, 1 y., 1 m., 3 w., 5 d.; s., Oxford Duke (5314); d., Bangle (Imp.); s. of d., Skiuner (1620, J.J.H.B.);—and J. H. SHORE, Whatley House, near Frome, brown, **Sheet Eyes 4th**, 1 y., 3 m., 3 w., bred by W. Jean, Trinity, Jersey; s., Golden Trooper (2265, J.H.B.); d., Sweet Eyes 3rd (6539, J.H.B.).

Special Prize given by Sir James Blyth, Bart.—The Blythwood Challenge Silver Bowl, weighing 25 ounces, for the best Cow or Heifer in-Milk, in any of the Jersey Classes, bred in Great Britain or Ireland, to be awarded by inspection (see Special Conditions 59 in Prize Schedule).

I.—H. McCALMONT, M.P., Bishopswood, Ross, whole fawn, **Faux Pas**, 3 y., 2 m., 4 d.; s., Orange Peel (4702); d., Scarsdale Florida (vol. v. p. 664); s. of d., Marmalade (3515).

R.—LORD ROTHSCHILD, Tring Park, Herts, dark fawn, **Tulip 7th** (Reg. vol. viii. p. 29), 2 y., 1 m., 4 w.; s., Spot's Lad (4389); d., Tulip (vol. v. p. 723); s. of d., Sultan's Favourite (3841).

Special Prize given by His Grace the Duke of Marlborough.—A Challenge Cup, value 25 guineas, for the best Bull, not exceeding eighteen months old, Cow of any age in-Milk or in-Calf, and Heifer her produce in-Milk or in-Calf, in any of the Jersey Classes, the property of one Exhibitor (see Special Conditions 60 in Prize Schedule).

I.—Mrs. W. BARRON, Taplow House, Bucks, fawn, **Lord of the Isles**

2nd, 1 y., 1 w., 3 d., bred by the late W. Barron; s., **Champion Fuss** (5498); d., **Lady of the Lake 6th** (vol. vii. p. 9); s. of d., **Dora's Champion** (5142):—fawn, **Lady Tidy 3rd** (vol. vi. p. 326), 4 y., 2 m., 4 d., bred by the late W. Barron; s., **Lord of the Isles** (4612); d., **Lady Tidy** (vol. v. p. 715); s. of d., **Sir Joe** (3799):—and fawn, **Lady Tidy 4th** (vol. viii. p. 9), 2 y., 1 m., 1 w., 4 d., bred by the late W. Barron; s., **Dora's Champion** (5142); d., **Lady Tidy 3rd** (vol. vi. p. 326); s. of d., **Lord of the Isles** (4612).

R.—Mrs. H. R. PEEL, Byletts, Penbridge, Herefordshire, silver grey, **Letes**, 1 y., 4 m., 2 w., 6 d.; s., **Boreas** (5087); d., **Winter**; s. of d., **Orion** (3608):—yellow fawn, **Spring**, 5 y., 2 m., 1 w., 5 d.; s., **Orme** (4297); d., **Autumn**; s. of d., **Thunderbolt**:—and fawn, **Sheila**, 2 y., 3 m., 5 d.; s., **Orelia** (4958); d., **Spring**; s. of d., **Orme** (4297).

GUERNSEY.

CLASS 90.—*Guernsey Bull, calved in 1894 or 1895. [8 entries.]*

I. (£15).—Hon. Mrs. A. BAILLIE HAMILTON, Burley Lodge, Ringwood, Hants, fawn and white, **His Majesty**, 4 y., 1 m., 3 w., 2 d., bred by Mr. T. Le Prévost, L'Etiennerie Castel, Guernsey; s., **Lord Mortimer 2nd** (743, R.G.A.S., P.S.); d., **Lady Saumarez Cora** (1570, R.G.A.S., P.S.); s. of d., **Lord Mortimer** (549, R.G.A.S., P.S.).

II. (£10).—J. D. T. PARSONS, jun., Ashurst Place, Langton, Tunbridge Wells, lemon and white, **Rose Prince** (826, E.G.H.B.), 2 y., 5 m., 3 w., 2 d.; s., **Guess**; d., **Rose Blossom**; s. of d., **Rydale**.

III. (£5).—Sir H. D. TICHBORNE, Bart., Tichborne Park, Alresford, orange and white, **Dr. Jim** (891), 2 y., 11 m., 1 w., bred by D. de Moulipied, Ville Au Roi, Guernsey; s., **Noble Boy** (822, P.S., R.G.A.S.); d., **Fairy of the Ville Au Roi** (1463, P.S., R.G.A.S.).

R. & V. H. C.—W. A. GLYNN, Seagrove, Sea View, Isle of Wight, orange, fawn and white, **Hopeful 7th** (780, E.G.H.B.), 3 y., 8 m., 3 w., 3 d.; s., **Moscow** (492, E.G.H.B.); d., **Amelia** (1223, E.G.H.B.).

H. C.—J. C. FORSTER, Clatford Mills, Andover, red and white, **Uncle Peter** (1061, E.G.H.B.), 2 y., 10 m., 1 d., bred by P. Martel, Masse Castle; s., **Our Paradox** (873, P.S., R.G.A.S.); d., **Elmira** (1976, F.S., R.G.A.S.):—and H. J. GIBBS, Milford, Salisbury, red and white, **Croftan Brian** (888, E.G.H.B.), 3 y., 3 w., 4 d., bred by J. W. Martel, Préel, Castel, Guernsey; s., **Baron** (813, P.S., R.G.A.S.); d., **Friquet's Pride** (1760, P.S., R.G.A.S.).

CLASS 91.—*Guernsey Bull, calved in 1896. [7 entries.]*

I. (£15).—E. A. HAMBRO, Hayes Place, Hayes, Kent, fawn and white, **Jubilee Conqueror**, 1 y., 11 m., 3 w., 6 d., bred by A. J. Ozanne, Guernsey; s., **Masher 2nd**; d., **Sunlight 3rd**.

II. (£10).—W. A. GLYNN, Seagrove, Sea View, Isle of Wight, orange, fawn and white, **Frolic 6th** (899, E.G.H.B.), 2 y., 2 m., 3 w., 3 d.; s., **Frolic 5th** (612, E.G.H.B.); d., **Favourite 10th** (1288, E.G.H.B.).

III. (£5).—H. J. GIBBS, Milford, Salisbury, fawn and white, **Peter's finger** (940, E.G.H.B.), 2 y., 2 w., 6 d.; s., **Nobleman** (634, E.G.H.B.); d., **Polly des Paysans** (2278, E.G.H.B.).

R. & V. H. C.—A. H. WINGFIELD, Ampthill, pale red and white, **Inspector**, 1 y., 10 m., 3 w., 4 d.; s., **Benefactor** (659, E.G.H.B.); d., **Latilda** (2508, E.G.H.B.); s. of d., **Archibald** (442, P.S., R.G.A.S.).

H. C.—J. C. FORSTER, Clatford Mills, Andover, red and white, **Zeus** 1067, E.G.H.B.), 1 y., 6 m., 3 w., 2 d., bred by F. Jehan, Le Chene, Forest ;
., Royal Squire 2nd of L'Etiennerie ; d., Doutta Galla 3rd.

CLASS 92.—Guernsey Bull, calved in 1897. [9 entries.]

I. (£10.)—Sir F. A. MONTEFIORE, Bart., Worth Park, Crawley, fawn and white, **Signalman** 2nd, 1 y., 3 m. ; s., Signalman (585) ; d., Miranda 6th (2253).

II. (£5.)—H. J. GIBBS, Milford, Salisbury, red and white, **Milford Mayboy** (1027, E.G.H.B.), 1 y., 5 d. ; s., Sea Breeze (832, E.G.H.B.) ; d., Mystic (1985, E.G.H.B.).

III. (£2.)—Sir H. D. TICHBORNE, Bart., Tichborne Park, Alresford, red and white, **Harold** (997), 1 y., 2 m., 3 w., 3 d. ; s., Active Lad (653) ; d., Beauty du Bigard (2370).

R. & V. H. C.—Colonel H. W. SHAKERLEY, Burgate, Godalming, Surrey, fawn, **Captain Parry** (971), 1 y., 4 m., 1 w., 6 d., bred by A. Brehant, Pages, St. Martin's, Guernsey ; s., Captain Lyons 1st (1061, P.S., R.G.A.S.) ; d., Petite 5th (3945, P.S., R.G.A.S.).

V. H. C.—W. A. GLYNN, Seagrove, Sea View, Isle of Wight, orange, fawn and white, **Loyal of the Preel**, 1 y., 1 m., 3 w., 4 d., bred by J. W. Martell, Preel, Guernsey ; s., Squire of the Preel ; d., Friquet's Pride.

CLASS 93.—Guernsey Cow, in-Milk or in-Calf, calved before 1895. [15 entries.]

I. (£15.)—Hon. Mrs. A. BAILLIE HAMILTON, Burley Lodge, Ringwood, Hants, fawn and white, **Jessie** 10th, 3 y., 9 m., 3 d. ; s., Day Star (539, E.G.H.B.) ; d., Jessie 8th (1592, E.G.H.B.) ; d., Loyalist (103, E.G.H.B.).

II. (£10.)—Sir F. A. MONTEFIORE, Bart., Worth Park, Crawley, fawn and white, **Flora** (3288), 6 y., 3 m., bred by A. Hansferd, St. Peter's Port, Guernsey ; s., Deputy ; d., Starlight.

III. (£5.)—E. A. HAMBRO, Hayes Place, Kent, pale red, **Richesse du Chene** 2nd, 8 y., 2 m., 6 d., bred by F. Jehan, Guernsey ; s., Consul 1st ; d., Richesse du Chene.

R. & V. H. C.—W. A. GLYNN, Seagrove, Sea View, Isle of Wight, orange, fawn and white, **Jessica** 4th (3032), 3 y., 11 m., 2 w. ; s., Lord Moscow (698) ; d., Jessica (379).

V. H. C.—E. A. HAMBRO, red and white, **Rose of Ville Amphrey** 2nd, 5 y., 1 m., 3 w., 6 d., bred by J. Rose, Guernsey ; s., Amateur ; d., Rose of Ville Amphrey :—Hon. Mrs. A. BAILLIE HAMILTON, red fawn, **Florence** 6th, 4 y., 2 m., 2 w., 5 d. ; s., Sampson (269, E.G.H.B.) ; d., Florence (119, E.G.H.B.) :—and J. D. T. PARSONS, jun., Ashurst Place, Langton, Tunbridge Wells, lemon, fawn and white, **Fan** 11th (2137, E.G.H.B.), 6 y., 4 m., 6 d., bred by G. Long, Ogbourne, St. Andrew, Marlborough, Wilts ; s., Emin Pascha ; d., Fan 4th ; s. of d., Minstrel.

CLASS 94.—Guernsey Heifer, in-Milk or in-Calf, calved in 1895. [7 entries.]

I. (£10.)—W. A. GLYNN, Seagrove, Sea View, orange, fawn and white, **Beauty** 5th, 2 y., 10 m., 1 w., 4 d. ; s., Frolic 5th (612) ; d., Beauty 4th (1489).

II. (£5).—W. H. FOWLER, Claremont, Taunton, red and white, **Claremont Fuchsia** (3291, E.G.H.B.), 2 y., 11 m., 1 w., 3 d., bred by J. Tostevin, St. Peter's-in-the-Wood, Guernsey; s., Billy; d., Guernsey Polly.

III. (£2).—Sir F. A. MONTEFIORE, Bart., Worth Park, Crawley, fawn and white, **Lucy des Forgettes 4th**, 3 y., 4 m.; s., Sir Francis 2nd (440); d., Lucy des Forgettes (3792).

R. & V. H. C.—A. H. WINGFIELD, Ampthill, pale red, **Stella des Blicqs** (5018, G.H.B.), 2 y., 7 m., 4 w., bred by Alfred Carre, Blicqs, St. Andrew's, Guernsey; s., Percy des Houards; d., Alderney.

V. H. C.—W. A. GLYNN, orange, fawn and white, **Favourite 20th** (2972, E.G.H.B.), 2 y., 10 m., 3 w., 2 d.; s., Frolic 5th (612, E.G.H.B.); d., Favourite 10th (1287, E.G.H.B.).

CLASS 95.—Guernsey Heifer, calved in 1896. [7 entries.]

I. (£10).—Sir H. D. TICHBORNE, Bart., Tichborne Park, Alresford, fawn and white, **Daisy Pearl** (3340), 2 y., 4 m., 1 w., 4 d.; s., Active Lad (653); d., The Bride (2579).

II. (£5).—J. C. FORSTER, Clatford Mills, Andover, red and white, **Clatford Spot 5th** (3325, E.G.H.B.), 2 y., 5 d.; s., Young Sarnia (848, E.G.H.B.); d., Clatford Spot 3rd (2632, E.G.H.B.).

III. (£2).—W. A. GLYNN, Seagrove, Sea View, Isle of Wight, orange, fawn and white, **Dorothea 6th** (3346), 1 y., 10 m., 3 w., 3 d.; s., Frolic 5th (612); d., Dorothea 4th (2940).

R. & H. C.—W. H. FOWLER, Claremont, Taunton, pale red and white, **Claremont Jasmine**, 2 y., 3 m., 3 w., 6 d., bred by M. de Garis Lainé, St. Saviour's, Guernsey; s., Orange Boy (901, P.S.); d., Silvester 5th (2837, P.S.); s. of d., Captain (513, P.S.).

C.—W. A. GLYNN, orange, fawn and white, **Florry 5th** (3368), 1 y., 11 m., 2 w., 5 d.; s., Frolic 5th (612, E.G.H.B.); d., Florry 3rd (1862, E.G.H.B.).

CLASS 96.—Guernsey Heifer, calved in 1897. [13 entries.]

I. (£7).—H. J. GIBBS, Milford, Salisbury, fawn and white, **Milford Alice** (3843, E.G.H.B.), 1 y., 5 m.; s., Sea Breeze (832, E.G.H.B.); d., Alba 2nd (1781, E.G.H.B.).

II. (£5).—J. C. FORSTER, Clatford Mills, Andover, red and white, **Antona 7th** (3593, E.G.H.B.), 11 m., 4 w., 1 d.; s., Young Sarnia (848, E.G.H.B.); s., Antona 5th (2851, E.G.H.B.).

III. (£2).—W. H. FOWLER, Claremont, Taunton, fawn and white, **Claremont Sweet Marjorie 2nd** (3655, E.G.H.B.), 11 m., 3 w., 2 d.; s., Royal of the Hunguets (978, P.S.); d., Claremont Sweet Marjorie (3654, E.G.H.B.).

R. & V. H. C.—H. J. GIBBS, red and white, **Milford Betsy** (3844, E.G.H.B.), 11 m., 3 w., 6 d.; s., Milford Masher (934, E.G.H.B.); d., Milford Bramble (3466, E.G.H.B.).

W. C.—W. A. GLYNN, Seagrove, Sea View, Isle of Wight, orange, fawn and white, **Favourite 22nd** (3707, E.G.H.B.), 10 m., 2 w., 4 d.; s., Hopetoun 7th (780, E.G.H.B.); d., Favourite 13th (1852, E.G.H.B.).—**E. A. LAMBRO**, Hayes Place, Kent, fawn and white, **Hayes Bonnie 2nd**, 11 m., 3 w., 3 d.; s., Hayes Bonnie; d., Hayes Bonnie; s. of d., Paramour;—and **A. H. WINGFIELD**, Ampthill, red and white, **Helen of Ampthill** (3760,

E.G.H.B.), 1 y., 3 m., 3 w., 4 d.; s., **Benefactor** (659, E.G.H.B.); d., **Beauty of St. Sampson** (2862, E.G.H.B.); s. of d., **Amateur** (662, P.S., R.G.A.S.).

H. C.—W. A. GLYNN, orange, fawn and white, **Honesty 6th** (3765, E.G.H.B.), 10 m., 2 w., 1 d.; s., **Frolic 5th** (612, E.G.H.B.); d., **Honesty 2nd** (374, E.G.H.B.);—and Sir F. A. MONTEFIORE, Bart., Worth Park, Crawley, fawn and white, **Silvester 2nd**, 1 y., 2 m., 1 w.; s., **Sir Francis 3rd** (734); d., **Silvester** (2804).

KERRY.

CLASS 97.—Kerry Bull, calved in 1895, 1896, or 1897. [2 entries.]

I. (£7) and **Special (£5 5s.)***—W. H. MULLENS and R. W. STENT, Friars Hill, Guestling, near Hastings, black, **Coco**, 2 y., 2 m., 2 w., bred by C. R. W. Adeane, Babraham Hall, near Cambridge; s., **Babraham Beau** (240); d., **Brenda** (1997); s. of d., **Blackamoor** (246).

R.—ROBERTSON AND SONS, Church Farm, Babraham, Cambridge, black, **La Mancha Beau** (388), 11 m., 3 w., 4 d.; s., **Brabaham Beau** (240); d., **Blackey** (1504).

CLASS 98.—Kerry Cow or Heifer, in-Milk or in-Calf, calved before 1896. [2 entries.]

I. (£7.)—ROBERTSON AND SONS, Church Farm, Babraham, Cambridge, black, **Grenagh Cowslip**, about 3 y., entered in H.B. by inspection (2351).

R.—W. H. MULLENS and R. W. STENT, Friars Hill, Guestling, near Hastings, black, **Black Bess** (165), 10 y.

CLASS 99.—Heifer, calved in 1896 or 1897. [2 entries.]

I. (£7.)—ROBERTSON AND SONS, Church Farm, Babraham, Cambridge, black, **La Mancha Fan** (458), about 2 y.

R. and R. for Special.*—W. H. MULLENS and R. W. STENT, Friars Hill, Guestling, near Hastings, black, **Guestling Gypsy**, 2 y., 2 m., 2 w., 4 d.; s., **Gaylad** (288); d., **Empress** (1940).

DEXTER KERRY.

CLASS 100.—Dexter Kerry Bull, calved in 1895, 1896, or 1897. [5 entries.]

I. (£7.)—E. S. WOODIWISS, Upminster, Essex, black, **Simple Simon**, about 2 y.

II. (£5) and **Special (£5 5s.)†**—F. H. BAXENDALE, J.P., Framfield Place, Uckfield, Sussex, black, **Framfield Sweep**, 1 y., 10 m., 4 d.; s., **Framfield Orthodox** (196); d., **Framfield Pearl** (812); s. of d., **Kidmore Paradox 2nd** (59).

R.—F. H. BAXENDALE, J.P., red, **Framfield Chestnut**, 2 y., 2 w., 6 d.; s., **Framfield Orthodox** (196); d., **Framfield Blaze**.

* Given by the Kerry and Dexter Cattle Society, for the Best Animal in Class 97, 98, or 99, whose Sire and Dam were entered in the Herd Book.

† Given by the Kerry and Dexter Cattle Society, for the Best Animal in Class 100, 101, or 102, whose Sire and Dam were entered in the Herd Book.

R. for Special.*—ROBERTSON AND SONS, Church Farm, Babraham, Cambridge, black, **Makeshift**, 10 m., 23 d.; s., Fusilier (197); d., Olive (927).

CLASS 101.—Dexter Kerry Cow or Heifer, in-Milk or in-Calf, calved before 1896. [5 entries.]

I. (£7.)—COUNTESS DE LA WARR, Manor House, Bexhill, Sussex, red, **Buckhurst Opal**, calved 1893 (811).

II. (£5.)—E. S. WOODIWISS, Upminster, Essex, red, **Wee Kate**, about 6 y.

III. (£2.)—W. STALLARD, Sunny Lodge, Malvern Link, black, **Cryptomeria** (491), 7 y.

C.—COUNTESS DE LA WARR, red, **Whiteheather**, calved December, 1895 (853, H.B.).

CLASS 102.—Dexter Kerry Heifer, calved in 1896 or 1897.
[9 entries.]

I. (£7.)—ROBERTSON AND SONS, Church Farm, Babraham, Cambridge, black, **La Mancha Madge**, about 2 y. (1154 H.B.).

II. (£5.)—W. STALLARD, Sunny Lodge, Malvern Link, black, **Malvern Signorina** (981), 2 y., 3 m., 4 w., 1 d.; s., Honeyborne (135); d., Malvern ignora (980); s. of d., No. 46 Ballymore Herd (112).

III. (£2.)—F. H. BAXENDALE, J.P., Framfield Place, Uckfield, Sussex, black, calved 1897 (Earmark No. 472).

R. & H. C.—E. S. WOODIWISS, Upminster, Essex, red, **Golden Drop**, about 2 y.

H. C.—ROBERTSON AND SONS, black, **La Mancha First Choice**, about 2 y. (1136, H.B.).

C.—F. H. BAXENDALE, J.P., **Framfield Ivory**, calved 1897 (Earmark No. 474);—and ROBERTSON AND SONS, black, **La Mancha Bonny One**, about 2 y. (1128, H.B.).

DAIRY.

CLASS 103.—Cow, in-Milk, of any breed or cross, under 900 lbs. live weight, yielding the largest quantity of milk, containing 12·25 per cent. of total solids, of which not less than 3·25 per cent. shall be fat. 1st prize, £10; 2nd prize, £3; 3rd prize, £2.

[No ENTRY.]

CLASS 104.—Cow, in-Milk, of any breed or cross, 900 lbs. live weight or over, yielding the largest quantity of milk, containing 12·25 per cent. of total solids, of which not less than 3·25 per cent. shall be fat. [5 entries.]

(£10.)—J. D. T. PARSONS, jun., Ashurst Place, Langton, Tunbridge wells, lemon, fawn and white, **Fan 11th** (2137, E.G.H.B.), 6 y., 4 m., 6 d., bred by G. Long, Ogbourne St. Andrew, Marlborough, Wilts; s., **Emin Pascha**; d., **Fan 4th**; s. of d., **Minstrel**.

* Given by the Kerry and Dexter Cattle Society, for the **Best Animal** in Class 100, 101, or 102, whose Sire and Dam were entered in the **Herd Book**.

II. (£3.)—T. JAMES, Vineyards Farm, Charlton Kings, Cheltenham, roan Shorthorn, **Chidley**, 5 y., 1 m., 2 w., 3 d.

III. (£2.)—T. JAMES, red Shorthorn Cross, **Dairy**, 4 y., 4 d.

CLASS 105.—*Pair of Dairy Cows in full profit.* [1 entry.]

(Given by the Cardiff Local Committee and confined to residents in South Wales or Monmouthshire.)

I. (£8.)—W. WHITING, Industrial Farm, Aberdare, brown and white, **Blason and Daisy**.

CLASS 106.—*Dairy Cow or Heifer in full profit.* 1st prize, £5;
2nd prize, £2. [1 entry.]

(Offered by the Cardiff Local Committee and confined to residents in South Wales or Monmouthshire.)

[No AWARD.]

BUTTER TEST PRIZES.

(Given by the English Jersey Cattle Society.)

CLASS 107.—*Cow, of any breed or cross, under 900 lbs. live weight, obtaining the greatest number of points by the practical Test of the Separator and Churn, judged by the scale of points adopted by the English Jersey Cattle Society.*

I. (£10) and Silver Medal.*—Dr. H. WATNEY, Buckhold, Pangbourne, brown Jersey, **Marryatt's Lass**, 4 y., 6 m., 2 w., 6 d., bred by P. J. Bree, Grouville, Jersey; s., Villo (1438); d., La Sentes Marionette 2nd.

II. (£3) and Bronze Medal.—W. MCKENZIE BRADLEY, Leylands, Meopham, Kent, whole, **Gauntlet**, 5 y., 1 m., 3 w., bred by F. H. L. Boutillier, St. Owen's, Jersey; s., Golden Lad (3324); d., Comtesse (2464); s. of d., Rosebery (584).

III. (£2.)—Dr. H. WATNEY, fawn Jersey, **Sherbet 2nd**, 3 y., 5 m., 3 w., 1 d.; s., Sugar Maple (5015); d., Sherbet; s. of d., The Bard (2212).

Certificates of Merit.—Mrs. C. MCINTOSH, Havering Park, Essex, fawn Jersey, **Zenobia 34th** (E.J.H.B.), 6 y., 8 m.; s., Peeping Tom (E.J.H.B.); d., Zenobia 23rd (E.J.H.B.); s. of d., Golden Racket (E.J.H.B.):—and Dr. H. WATNEY, grey fawn Jersey, **Queen Bess of Ruthven**, 5 y., 3 m., 1 w., 1 d., bred by Miss Hervey, Auchterarder, N.B.; s., Jim of Ruthven (4199); d., Grey Queen; s. of d., Rosa's Welcome (3726).

CLASS 108.—*Cow, of any breed or cross, 900 lbs. live weight and over, obtaining the greatest number of points by the practical Test of the Separator and Churn, judged by the scale of points adopted by the English Jersey Cattle Society.*

I. (£10) and Gold Medal.*—Dr. H. WATNEY, Buckhold, Pangbourne, fawn Jersey, **Sheila of Ruthven**, 7 y., 10 m., 1 w., 2 d., bred by Miss Hervey, Auchterarder, N.B.; s., Silver King (3794); d., Sybil (vol. v. p. 706); s. of d., Thunderbolt (1261).

* Gold, Silver, and Bronze Medals given for the three Jersey Cows, entered or eligible for entry in the English Jersey Herd Book, obtaining the greatest number of points in the test.

xxxiv *Prizes awarded to Cotswold and Devon Long-Wool Sheep.*

II. (£3.)—Dr. H. WATNEY, fawn Jersey, **Sherbet**, 7 y., 6 m., 3 d.; s., The Bard (2212); d., Sherry (vol. v. p. 668); s. of d., Thunderbolt (1261).

(Given by the English Guernsey Cattle Society.)

CLASS 109.—*Cow or Heifer, entered in the English Guernsey Cattle Society's Herd Book, yielding the largest quantity of Butter by the practical Test of the Separator and Churn.* [9 entries.]

I. (Silver Cup.)—J. D. T. PARSONS, jun., Ashurst Place, Langton, Tunbridge Wells, lemon, fawn and white, **Fan 11th** (2137, E.G.H.B.), 6 y., 4 m., 6 d., bred by G. LONG, Ogbourne St. Andrew, Marlborough, Wilts; s., Emin Pascha; d., Fan 4th; s. of d., Minstrel.

II. (Silver Medal and £1.)—Sir F. A. MONTEFIORE, Bart., Worth Park, Crawley, fawn and white, **Flora** (3288), 6 y., 3 m., bred by A. Hanserd, St. Peter's Port, Guernsey; s., Deputy; d., Starlight.

III. (Bronze Medal and £1.)—E. A. HAMBRO, Hayes Place, Kent, pale red, **Richesse du Chene 2nd**, 8 y., 2 m., 6 d., bred by F. Jehan, Guernsey; s., Consul 1st; d., Richesse du Chene.

SHEEP.

COTSWOLD.

CLASS 110.—*Cotswold Shearling Ram.* [8 entries.]

I. (£10.)—R. SWANWICK, Royal Agricultural College Farm, Cirencester, 1 y., 3 m., 4 w.

II. (£5.)—II. McCALMONT, M.P., Bishopswood, Ross, **Andree**, 1 y., 3 m., 3 w., bred by R. Garne, Aldsworth, Northleach.

III. (£2.)—R. SWANWICK, 1 y., 3 m., 1 w., 4 d.

R.—F. CRADDOCK, Eastington, Northleach, Gloucester, 1 y., 3 m., 2 w.

C.—H. McCALMONT, M.P., **Neptune**, 1 y., 3 m., 1 w., bred by R. Garne, Aldsworth, Northleach.

CLASS 111.—*Pair of Cotswold Ram Lambs, dropped in 1898.*

[5 entries.]

I. (£10.)—R. SWANWICK, Royal Agricultural College Farm, Cirencester, 4 m., 3 w., 2 d.

II. (£5.)—R. SWANWICK, 4 m., 3 w., 2 d.

III. (£2.)—W. THOMAS, The Hayes, Sully, Penarth, about 4 m.

CLASS 112.—*Pen of Three Cotswold Shearling Ewes.* [1 entry.]

I. (£10.)—F. CRADDOCK, Eastington, Northleach, Gloucester, 1 y., 3 m., 1 w.

DEVON LONG-WOOL.

CLASS 113.—*Devon Long-Wool Shearling Ram.* [11 entries.]

I. (£10.)—C. G. THORNE, Curdon, Williton, Somerset, 1 y., 3 m.

I. (£5.)—C. G. THORNE, 1 y., 3 m.

II. (£2.)—R. COOK, Chevithorne, Tiverton, Devon, 1 y., 3 m., 2 w., bred N. COOK, Crazelowman, Tiverton.

R.—R. COOK, 1 y., 3 m., 2 w., bred by N. COOK.

H. C.—A. C. SKINNER, Pound Farm, Bishop's Lydeard, Somerset, about 3 m., 3 w.:—and C. G. THORNE, 1 y., 3 m.

CLASS 114.—*Pair of Devon Long-Wool Ram Lambs, dropped in 1898.*
[6 entries.]

I. (£10.)—R. COOK, Chevithorne, Tiverton, Devon, 3 m., 3 w.

II. (£5.)—R. COOK, 3 m., 3 w.

III. (£2.)—A. C. SKINNER, Pound Farm, Bishop's Lydeard, Somerset, about 3 m., 3 w.

R.—A. C. SKINNER, about 3 m., 3 w.

H. C.—A. C. SKINNER, about 3 m., 3 w.

CLASS 115.—*Pen of Three Devon Long-Wool Shearling Ewes.*
[3 entries.]

I. (£10.)—R. COOK, Chevithorne, Tiverton, Devon, 1 y., 3 m., 2 w., bred N. COOK, Crazelowman, Tiverton.

II. (£5.)—R. COOK, 1 y., 3 m., 2 w., bred by N. COOK.

III. (£2.)—R. COOK, 1 y., 3 m., 3 w., bred by N. COOK.

SOUTHDOWN.

CLASS 116.—*Southdown Shearling Ram.* [7 entries.]

I. (£10.)—EARL CADOGAN, K.G., Culford Hall, Bury St. Edmunds, 1 y., 1., 2 w.

II. (£5.)—SIR J. BLYTH, Bart., Blythwood, Stansted, Essex, about 1 y., 1., 1 w., 3 d.

III. (£2.)—EARL BATHURST, Cirencester Park, 1 y., 3 m., 2 w.

R.—EARL CADOGAN, K.G., 1 y., 3 m., 2 w.

CLASS 117.—*Pair of Southdown Ram Lambs, dropped in 1898.*
[4 entries.]

I. (£10.)—C. R. W. ADEANE, Babraham Hall, Cambridge, about 3 m., 2 w.

II. (£5.)—SIR J. BLYTH, Bart., Blythwood, Stansted, Essex, 3 m., 1 w.,

R.—EARL CADOGAN, Culford Hall, Bury St. Edmunds, 3 m., 2 w.

CLASS 118.—*Pen of Three Southdown Shearling Ewes.* [3 entries.]

I. (£10.)—EARL CADOGAN, K.G., Culford Hall, Bury St. Edmunds.

II. (£5.)—SIR J. BLYTH, Bart., Blythwood, Stansted, Essex, about 1 y., 1., 1 w., 3 d.

R.—EARL BATHURST, Cirencester Park, 1 y., 3 m., 2 w.

HAMPSHIRE DOWN.

CLASS 119.—*Hampshire Down Shearling Ram.* [9 en

I. (£10).—LORD ROTHSCHILD, Tring Park, Tring, Herts, about 2 w.

II. (£5).—A. DE MORNAY, Col d'Arbres, Wallingford, Col (No. 8), 1 y., 4 m.

III. (£2).—L. H. BAXENDALE, Greenham Lodge, Newb 1 y., 4 m., 2 w.

R. & C.—H. C. STEPHENS, M.P., Cholderton, Salisbury, C 15th, 1 y., 4 m., 2 w.

CLASS 120.—*Pair of Hampshire Down Ram Lambs, dropp*
[9 entries.]

I. (£10).—L. H. BAXENDALE, Greenham Lodge, Newbury, 1½ w.

II. (£5).—LORD ROTHSCHILD, Tring Park, Tring, Herts, about

III. (£2).—LORD ROTHSCHILD, about 4 m., 2 w.

R. & H. C.—A. DE MORNAY, Col d'Arbres, Wallingford, 4 m.,

CLASS 121.—*Pen of Three Hampshire Down Shearling*
[2 entries.]

I. (£10).—A. DE MORNAY, Col d'Arbres, Wallingford, 4 m., 1

SHROPSHIRE.

CLASS 122.—*Shropshire Shearling Ram.* [24 entri

I. (£10).—J. BOWEN-JONES, Ensdon House, Montford Bridge, about 1 y., 3 m.

II. (£5).—W. F. INGE, Thorpe Hall, Tamworth, about 15 m.

III. (£2).—Mrs. M. BARRS, Odstone Hall, Atherstone, abou 3 w.

R. & H. C.—J. HARDING, Norton House, Shifnal, about 1 y.,

H. C.—Mrs. M. BARRS, about 1 y., 2 m., 3 w. :—A. S. BERRY Farm, Great Barr, Birmingham, about 1 y., 3 m. :—J. BOWEN 1 y., 3 m. :—A. BRADBURN, Moat Bank, Lichfield, about 1 R. P. COOPER, Shenstone Court, Lichfield, Staffordshire, 1 y., 4 n 1 y., 4 m. :—P. L. MILLS, Ruddington Hall, Nottingham :—and Shrewardine, Shrewsbury, 1 y., 3 m.

C.—A. S. BERRY, about 1 y., 3 m. :—G. L. FOSTER-HARTER, P fewkesbury, about 1 y., 4 m. :—P. L. MILLS :—and A. TANNER,

CLASS 123.—*Pair of Shropshire Ram Lambs, dropped i*
[11 entries.]

I. (£10).—W. F. INGE, Thorpe Hall, Tamworth, about 12 w.

II. (£5).—A. BRADBURN, Moat Bank, Lichfield.

III. (£2).—J. HARDING, Norton House, Shifnal, about 3 m., i

Prizes awarded to Somerset and Dorset Horn Sheep. xxxvii

R. & H. C.—P. L. MILLS, Ruddington Hall, Nottingham.

H. C.—G. L. FOSTER-HARTER, Puckrup Hall, Tewkesbury, about 4 m.:—
and A. TANNER, Shrawardine, Shrewsbury, 3 m.

C.—H. C. G. PARKER, Brockton Grange, Shifnal, 3 m.

CLASS 124.—*Pen of Three Shropshire Shearling Ewes.* [9 entries.]

I. (£10.)—J. BOWEN-JONES, Ensdon House, Montford Bridge, Shropshire,
about 1 y., 3 m.

II. (£5.)—P. L. MILLS, Ruddington Hall, Nottingham.

III. (£2.)—Mrs. M. BARUS, Odstone Hall, Atherstone, about 1 y.,
m., 3 w.

R. & H. C.—A. TANNER, Shrawardine, Shrewsbury, 1 y., 3 m.

H. C.—R. P. COOPER, Shenstone Court, Lichfield, Staffordshire, 1 y., 3 m.:—
and FENN, Stonebrook House, Ludlow, about 1 y., 2 m., 2 w.:—and W. F.
SAGE, Thorpe Hall, Tamworth, about 15 m.

C.—R. P. COOPER, 1 y., 3 m.

OXFORD DOWN.

CLASS 125.—*Oxford Down Shearling Ram.* [4 entries.]

I. (£10.)—C. HOBBS AND SON, Maisey Hampton, Fairford, 1 y., 3 m.

II. (£5.)—W. A. TREWEEKE, Ryne Hill, Chipping Norton, 1 y., 3 m., 2 w.

R.—C. HOBBS AND SON, 1 y., 3 m.

C.—W. A. TREWEEKE, 1 y., 3 m.

CLASS 126.—*Pair of Oxford Down Ram Lambs, dropped in 1898.*
[2 entries.]

I. (£10.)—W. A. TREWEEKE, Ryne Hill, Chipping Norton, 4 m.,
w., 6 d.

R.—W. A. TREWEEKE, 4 m., 1 w., 2 d.

CLASS 127.—*Pen of Three Oxford Down Shearling Ewes.*
[3 entries.]

I. (£10.)—W. A. TREWEEKE, Ryne Hill, Chipping Norton, 1 y., 3 m.

II. (£5.)—W. A. TREWEEKE, 1 y., 3 m., 1 w.

R.—G. C. WILLIAMS, Llanrumney Hall, Cardiff, about 15 m.

SOMERSET AND DORSET HORN.

CLASS 128.—*Somerset and Dorset Horn Shearling Ram.* [5 entries.]

I. (£10.)—W. R. FLOWER, West Stafford, Dorchester, Flower's No. 55,
about 1 y., 5 m., 1 w.

II. (£5.)—H. McCALMONT, M.P., Bishopswood, Ross, 1 y., 6 m., 2 d.

R. & H. C.—W. R. FLOWER, Flower's No. 53, about 1 y., 5 m., 1 w.

C.—W. R. FLOWER, Flower's No. 54, about 1 y., 5 m., 1 w.:—and
I. McCALMONT, M.P., 1 y., 5 m., 3 w., bred by W. R. Flower.

xxxviii *Prizes awarded to Welsh Mountain Sheep.*

CLASS 129.—Pair of Somerset and Dorset Horn Lambs, dropped after Nov. 1st, 1897. [3 entries.]

I. (£10.)—W. R. FLOWER, West Stafford, Dorchester, Flower's Nos. 58 and 57, about 5 m., 3 w.

II. (£5.)—W. R. FLOWER, Flower's Nos. 58 and 59, about 5 m., 3 w.

CLASS 130.—Pen of Three Somerset and Dorset Horn Shearling Ewes.—[3 entries.]

I. (£10.)—H. McCALMONT, M.P., Bishopswood, Ross, 1 y., 6 m., bred by W. Paul.

II. (£5.)—H. McCALMONT, M.P., 1 y., 6 m.

R. & H. C.—W. R. FLOWER, West Stafford, Dorchester, about 1 y., 5 m., 1 w.

WELSH MOUNTAIN.

CLASS 131.—Welsh Mountain Two Shear or Shearling Ram. [9 entries.]

I. (£10.)—P. P. PRATT, Brynlethry Hall, St. Asaph, 1 y.

II. (£5.)—J. THOMAS, Nantymadog, Senny Bridge, Brecon, Cymro, 1 y., 1 m., 2 w.

III. (£2.)—O. PRICE, Nantyrharn, Cray, Brecon, Gruffydd, 2 y., 2 m., 1 w.

R.—O. PRICE, Llewelyn, 1 y., 2 m., 2 w.

CLASS 132.—Pen of Three Welsh Mountain Shearling Ewes. [5 entries.]

I. (£10.)—P. P. PRATT, Brynlethry Hall, St. Asaph.

II. (£5.)—J. THOMAS, Nantymadog, Senny Bridge, 1 y., 1 m., 1 w.

R.—O. PRICE, Nantyrharn, Cray, Brecon, 1 y., 2 m., 2 w.

H. C.—O. PRICE, 1 y., 2 m., 3 w.

C.—J. THOMAS, 1 y., 1 m., 2 w.

ANY BREED.

Prizes in Classes 133, 134 and 135 were given by the Cardiff Local Committee, and were confined to Tenant Farmers residing in South Wales or Monmouthshire.

CLASS 133.—Pair of Any Breed Lambs, dropped in 1898. [2 entries.]

I. (£5.)—J. THOMAS, Nantymadog, Senny Bridge, 1 y., 1 m., 1 w.

R.—O. PRICE, Nantyrharn, Cray, Brecon, 1 y., 2 m., 2 w.

CLASS 134.—Pen of Three Any Breed Ewes that have bred Lambs in 1898 (with or without offspring). [1 entry.]

I. (£5.)—J. THOMAS, Nantymadog, Senny Bridge, 1 y., 1 m., 1 w.

CLASS 135.—Pen of Three Ewe Lambs. [2 entries.]

I. (£5.)—W. THOMAS, The Hayes, Sully, Penarth, **Cotswold**, about 4 m.

II. (£3.)—E. AKERS, Pentreban Farm, St. Fagans, **Hampshire Down**, 3 m., 3 w.

P I G S.

BERKSHIRE.

CLASS 136.—Berkshire Boar, farrowed in 1895, 1896, or 1897.

[11 entries.]

I. (£7.)—J. JEFFERSON, Peel Hall, Chester, **Peel Victor** (5878), 2 y., 4 m., 3 w., bred by J. A. Caird, Micheldever, Hants; s., Dr. Jameson (5513); d., Cat's Eye (5234); s. of d., Waterloo (4130).

II. (£3.)—E. BURBIDGE, South Wraxall, Bradford-on-Avon, 1 y., 10 m., 1 d., bred by Earl Carnarvon, Highclere, Newbury; s., Trumpeter; d., Highclere 30th; s. of d., Minting.

III. (£2.)—N. BENJAFIELD, Short's Green Farm, Motcombe, Shaftesbury, Dorset, **Ace of Trumps**, 1 y., 1 m., 3 w.; s., Julius (5693); d., Thorn-grove Duchess 2nd (5697); s. of d., Marmaduke (4059).

R. & H. C.—J. P. KING, North Stoke, Wallingford, **Lord Ruby**, 2 y., 9 m., 1 d., bred by J. A. Caird; s., Dr. Jameson; d., Highland Marine; s. of d., Highlander.

C.—J. LAWRENCE, Stall Pits Farm, Shrivenham, **Lord Harris**, 2 y., 4 m., 2 d., bred by the Rev. W. Fawcett, Somerford Keynes, Cricklade; s., Fast Bowler (5447); d., Fair-to-see (4508); s. of d., Fitzcurzon (3730);—and G. T. TOMKIN, The Moat, Marden, Kent, 1 y., 1 m., 3 w., bred by N. Benjafield, Motcombe, Shaftesbury; s., Julius (5693); d., Thorn-grove Duchess 2nd (5697); s. of d., Marmaduke (4059).

CLASS 137.—Pair of Berkshire Boars, farrowed in 1898.

[5 entries.]

I. (£5.)—R. SWANWICK, Royal Agricultural College Farm, Cirencester, 4 m., 3 w., 2 d.; s., Loyal Bucks (B.B.); d., Stumpy (1327, B.B.); s. of d., Andover C. (5562, B.B.).

II. (£2.)—R. SWANWICK, 4 m., 3 w., 1 d.; s., Loyal Bucks (B.B.); d., Stumpy (1427, B.B.); s. of d., Andover C. (5562, B.B.).

R. & C.—N. BENJAFIELD, Short's Green Farm, Motcombe, Shaftesbury, Dorset, 4 m., 3 w., 2 d.; s., Mortown Duke; d., Tribby (6058); s. of d., Benjamin (4215).

C.—J. JEFFERSON, Peel Hall, Chester, 4 m., 3 w., 5 d.; s., Peel Surprise (5984); d., Peel Kitty; s. of d., Walton Turk (4712).

CLASS 138.—Berkshire Breeding Sow, farrowed before 1898.

[12 entries.]

I. (£7.)—E. BURBIDGE, South Wraxall, Bradford-on-Avon, **Pretty Jane**, 1 y., 5 m., 2 w., 4 d.; s., Swansea (3751); d., Plain Jane (5715); s. of d Tunbridge (4028).

II. (£3.)—J. A. FRICKER, Burton, Mere, Wilts, **May Burton F.**, 1 y., 3 m., 5 d.; s., Harrold Augustus 2nd; d., May Burton 2nd.

III. (£2.)—J. JEFFERSON, Peel Hall, Chester, **Peel Flirtation** (5874), 2 y., 9 m., bred by E. Burbidge; s., Halle (3626); d., Flirtation (4029); s. of d., Ransom (2675).

R. & H. C.—R. SWANWICK, Royal Agricultural College Farm, Cirencester, **Sallie** (876), 2 y., 2 m., 2 w., 3 d.; s., Hampshire (5563, B.B.); d., Sallie (666, B.B.); s. of d., Prince Imperial (2171, B.B.).

H. C.—R. W. HUDSON, Danesfield, Marlow, Bucks, **Danesfield Poem**, 2 y., 4 m., 3 w., 2 d., bred by the late W. Pinnock, Wantage; s., Teufel (5240); d., Prize Poem B. (3906); s. of d., Warwick Lord (5304):—and J. P. KING, North Stoke, Wallingford, **Lady Oxford 2nd**, 2 y., 4 m., 1 w., 5 d.; s., First Lord; d., Lady Oxford; s. of d., Atbelhampton.

C.—G. T. TOMKIN, The Moat, Marden, Kent, 1 y., 2 m., 3 w., 2 d.; s., Marden Malcolm; d., Marden Mayblossom; s. of d., Flordon Bait.

CLASS 139.—Pair of Berkshire Breeding Sows, farrowed in 1898.

[9 entries.]

I. (£5.)—J. A. FRICKER, Burton, Mere, Wilts, 4 m., 3 w.; s., First Catch F; d., Torrington F.

II. (£2.)—J. JEFFERSON, Peel Hall, Chester, 4 m., 3 w., 2 d.; s., Peel Surprise (5884); d., Peel Annie (vol. xiv.); s. of d., Walton Turk (4712).

III. (£1.)—N. BENJAFIELD, Short's Green Farm, Motcombe, Shaftesbury, Dorset, 4 m., 3 w., 2 d.; s., Mertown Duke; d., Trilby (6058); s. of d., Benjamin (4215).

R. & H. C.—G. T. TOMKIN, The Moat, Marden, Kent, 4 m., 3 w., 3 d.

H. C.—R. SWANWICK, Royal Agricultural College Farm, Cirencester, 4 y., 3 m., 1 d.; s., Loyal Bucks (B.B.); d., Stumpy (1427, B.B.); s. of d., Andover C. (5562, B.B.).

C.—J. LAWRENCE, Stall Pitts Farm, Shrivenham, Berks, 4 m., 1 w., 4 d.; s., Legerdemain; d., Laurel (4480); s. of d., Fitzroy (4095).

LARGE WHITE.

CLASS 140.—Large White Boar, farrowed in 1895, 1896, or 1897.

[5 entries.]

I. (£7.)—Sir G. GREENALL, Bart., Walton Hall, Warrington, **Walton Laddin** (4059), 3 y., 3 m.; s., Walton Captain (3171); d., Sunbeam 8th 4756; s. of d., Ben 3rd (927).

II. (£3.)—Sir G. GREENALL, Bart., **Walton Knutsford** (4063), 3 y., 3 m., 6 d.; s., Walton Eclipse (3621); d., Walton Belle (6004); s. of d., Chesterfield 2nd (2665).

J. B. LAWRENCE, Holywell Manor, St. Ives, Hunts, 1 y., 8 m., 3 w., 4 d.; Holywell Mixture; d., Holywell Victoria 3rd.

J.—F. ALLMAND, Victoria Mill, Wrexham, **Wrexham Major**, 1 y., 4 m., 3 d.; s., Wrexham Sol. (4117); d., Wrexham Juno (6846).

CLASS 141.—Pair of Large White Boars, farrowed in 1898.
[4 entries.]

- I. (£5.)**—S. SPENCER, Holywell Manor, St. Ives, Hunts, 4 m., 3 w., 3 d.
II. (£2.)—F. ALLMAND, Victoria Mill, Wrexham, 4 m., 6 d.; s., Wrexham ean (4431); d., Wrexham Juno (6846).
R.—S. SPENCER, 4 m., 3 w., 3 d.

CLASS 142.—Large White Breeding Sow, farrowed before 1898.
[5 entries.]

- I. (£7.)**—Sir G. GREENALL, Bart., Walton Hall, Warrington, **Walton unflower** (6792) 3 y., 3 m.; s., Walton Captain (3171); d., Sunbeam th (4756); s. of d., Ben 3rd (927).
II. (£3.)—F. ALLMAND, Victoria Mill, Wrexham, **Wrexham Bessie** nd (7560), 2 y., 3 m., 3 w., 4 d.; s., Wrexham Scot (4115); d., Wrexham essie (5310); s. of d., Wrexham Joe (2843).
R.—S. SPENCER, Holywell Manor, St. Ives, Hunts, **Holywell Model**, y., 4 m., 1 w., 1 d.; s., Holywell Plymouth; d., Holywell Waxwork; s. of d., olywell King.
H. C.—F. ALLMAND, **Wrexham Belle** (6828), 3 y., 4 m., 1 w., 4 d.; , Wrexham Ben (3633); d., Wrexham Katie (6032); s. of d., Wrexham Joe (843).

CLASS 143.—Pair of Large White Breeding Sows, farrowed in 1898.
[4 entries.]

- I. (£5.)**—S. SPENCER, Holywell Manor, St. Ives, Hunts, 4 m., 3 w., 3 d.
II. (£2.)—S. SPENCER, 4 m., 3 w., 3 d.
R.—Sir G. GREENALL, Bart., Walton Hall, Warrington, 4 m., 1 w., 3 d.; Long Sam (339); d., Walton Belle 4th (6780); s. of d., Walton Eclipse (621).

MIDDLE WHITE BREED.

CLASS 144.—Middle White Boar, farrowed in 1895, 1896, or 1897.
[3 entries.]

- I. (£7.)**—A. C. TWENTYMAN, Castlecroft, near Wolverhampton, **Castlecroft oyal Emperor**, 1 y., 4 m., 3 w., 1 d.; s., Morden Pure Gold (3253); d., astlecroft Daffodil (6874); s. of d., Castlecroft Robin Hood (3651).

CLASS 145.—Pair of Middle White Boars, farrowed in 1898.
[6 entries.]

- I. (£5.)**—S. SPENCER, Holywell Manor, St. Ives, Hunts, 4 m., 3 w., 2 d.; , Holywell Count.
II. (£2.)—Sir GILBERT GREENALL, Bart., Walton Hall, Warrington, m., 1 w., 3 d.; s., Walton General (4171); d., Walton Mayflower 2nd (126); s. of d., Badger (2845).
III. (£1.)—A. C. TWENTYMAN, Castlecroft, near Wolverhampton, 4 m., Castlecroft Daffodil (6874); d., Castlecroft Robin Hood (3651).
R.—S. SPENCER, 4 m., 3 w., 2 d.; s., Holywell Count.

xlii *Prizes awarded to Pigs (Small White or Small Black).*

H. C.—Hon. D. P. BOUVERIE, Coleshill House, Highworth, Wilts, 4 m., 3 w., 2 d.; s., Coleshill Metchley (4461); d., Coleshill Girl (7596); s. of d., Ringdale Hero (4489).

CLASS 146.—Middle White Breeding Sow, farrowed before 1898.
[10 entries.]

I. (£7.)—S. SPENCER, Holywell Manor, St. Ives, Hunts, **Holywell Middlesboro**, 6 y., 6 m., 4 w., 2 d.; s., Holywell Slasher; d., Holywell Satin 2nd; s. of d., Holywell Ponfield.

II. (£3.)—S. SPENCER, 1 y., 3 m., 2 w., 4 d.; s., Holywell Stumpy Tail.

III. (£2.)—A. C. TWENTYMAN, Castlecroft, near Wolverhampton, **Castlecroft Daisy Bell** (5328), 5 y., 4 m., 2 w., 5 d.; s., Bruce (2451); d., Castlecroft Marigold (5334); s. of d., Young Juan (1551).

R.—Sir G. GREENALL, Bart., Walton Hall, Warrington, **Walton Rose** (6926), 3 y., 7 m., 1 w., 6 d.; s., Walton Major (3695); d., Walton Pansy (5418); s. of d., Prince of Worsley (1527).

H. C.—Hon. D. P. BOUVERIE, Coleshill House, Highworth, Wilts, 1 y., 2 m., 5 d.; s., Coleshill Metchley (4461); d., Coleshill Girl (7596); s. of d., Ringdale Hero (4489):—and A. C. TWENTYMAN, **Castlecroft Rose 2nd** (6876), 5 y., 6 m., 1 w., 1 d.; s., Young Juan (1551); d., Rosy (2718); s. of d., Silver King (603).

CLASS 147.—Pair of Middle White Breeding Sows, farrowed in 1898.
[6 entries.]

I. (£5.)—S. SPENCER, Holywell Manor, St. Ives, Hunts, 4 m., 1 w., 3 d.

II. (£2.)—Sir G. GREENALL, Bart., Walton Hall, Warrington, 4 m., 3 w.; s., Walton Editor (4499); d., Walton Rose (6926); s. of d., Walton Major (3695).

III. (£1.)—A. C. TWENTYMAN, Castlecroft, near Wolverhampton, 4 m., 3 d.; s., Castlecroft Robin Hood (3651); d., Castlecroft Lady Leicester (7590); s. of d., Morden Pure Gold (3253).

R. & H. C.—S. SPENCER, 4 m., 3 w., 2 d.

C.—Hon. D. P. BOUVERIE, Coleshill House, Highworth, Wilts, 4 m., 3 w., 2 d.; s., Coleshill Metchley (4461); d., Coleshill Girl (7596); s. of d., Ringdale Hero (4489).

SMALL WHITE OR SMALL BLACK BREED.

CLASS 148.—Small White or Small Black Boar, farrowed in 1895, 1896, or 1897. [6 entries.]

I. (£7.)—Hon. D. P. BOUVERIE, Coleshill House, Highworth, Wilts, white, 1 y., 4 m., 3 w., 6 d.; s., Coleshill Dick (4505); d., Coleshill Princess (6942); s. of d., Coleshill Joe (2888).

II. (£3.)—Sir G. GREENALL, Bart., Walton Hall, Warrington, 1 y., 3 m., 1 w., 6 d.; s., Temple Champion (4179); d., Walton Tiny (7706); s. of d., Prescott (2897).

III. (£2.)—Hon. D. P. BOUVERIE, **Coleshill Enterprise** (4511), 1 y., 11 m., 1 w., 3 d.; s., Coleshill Dick (4505); d., Coleshill Empress (5444); s. of d., King William (2097).

R.—Hon. D. P. BOUVERIE, white, **Coleshill Laddie** (4515), 2 y., 11 m.; s., Prescott (2897); d., Coleshill Lady (5446); s. of d., King William (2097).

CLASS 149.—*Pair of Small White or Small Black Boars, farrowed in 1898.* [1 entry.]

L. (£5.)—Hon. D. P. BOUVERIE, Coleshill House, Highworth, Wilts, 4 m., 2 d.; s., Coleshill Royal Emperor (4521); d., Coleshill Polly (5450); s. of d., King William (2097).

CLASS 150.—*Small White or Small Black Breeding Sow, farrowed before 1898.* [4 entries.]

L. (£7.)—Hon. D. P. BOUVERIE, Coleshill House, Highworth, Wilts, 1 y., 2 m., 3 w.; s., Coleshill Temple Victor (4525); d., Coleshill Betsy 2nd.

II. (£3.)—Sir G. GREENALL, Bart., Walton Hall, Warrington, **Manor Perfection**, 2 y., 4 m., 1 w., bred by D. Gibson, The Fields, Harbury, Leamington; s., Metchley Tom Thumb (3273); d., Metchley Royal (5466); s. of d., Prescott Toy (2099).

R. & H. C.—Sir G. GREENALL, Bart., **Walton Tiny** (7706), 2 y., 5 m., 3 w., 1 d., bred by D. P. Bouverie; s., Prescott (2897); d., Coleshill Lassie (5448); s. of d., King William (2097).

H. C.—Hon. D. P. BOUVERIE, 1 y., 4 m., 3 w., 2 d.; s., Coleshill Dick (4505); d., Coleshill Princess (6942); s. of d., Coleshill Joe (2885).

CLASS 151.—*Pair of Small White or Small Black Breeding Sows, farrowed in 1898.* [1 entry.]

I. (£5.)—Hon. D. P. BOUVERIE, Coleshill House, Highworth, Wilts, 4 m., 3 w., 4 d.; s., Coleshill Edward (4509); d., Coleshill Empress (5444); s. of d., King William (2097).

TAMWORTH.

CLASS 152.—*Tamworth Boar, farrowed in 1895, 1896, or 1897.* [2 entries.]

I. (£7.)—R. IBBOTSON, Knowle, Warwickshire, **Knowle King**, 1 y., 4 m., 2 w.; s., Warwickshire Monarch; d., Warwickshire Lady; s. of d., Whitacre Goldfinder.

II. (£3.)—R. IBBOTSON, **Knowle Red Duke** (4579), 1 y., 10 m., 4 w.; s., Knowle Baron (4229); d., Knowle Ruby 4th (7104); s. of d., Knowle Major.

CLASS 153.—*Pair of Tamworth Boars, farrowed in 1898.* [2 entries.]

I. (£5.)—R. IBBOTSON, Knowle, Warwickshire, 4 m., 2 w.; s., Knowle King; d., Knowle Mayflower.

R.—R. IBBOTSON, 4 m., 3 w., 1 d.; s., Knowle King; d., Knowle Princess May; s. of d., Knowle Duke.

CLASS 154.—*Tamworth Breeding Sow, farrowed before 1898.* [3 entries.]

I. (£7.)—R. IBBOTSON, Knowle, Warwickshire, **Knowle Gem**, 2 y., 4½ m., 2 w., 6 d.; s., Knowle Monarch; d., Knowle Confidence; s. of d., Knowle Duke.

II. (£3.)—R. IBBOTSON, Knowle Duchess 2nd, 1 y., 8 m., 3 w., 5 d., bred by T. Watson, Whitacre Hall, Coleshill; s., Warwickshire Monarch; d., Warwickshire Queen.

R.—Sir H. MATHER JACKSON, Bart., Llantilio Court, Abergavenny, Trustworthy, 11 m., 1 w., 2 d., bred by Col. I. Herbert, C.B., C.M.G., Llanarth Court, Abergavenny; s., Whitacre General (4259); d., Llanarth Confidence (4922); s. of d., Llanarth Duke.

CLASS 155.—*Pair of Tamworth Breeding Sows, farrowed in 1898.*
[2 entries.]

I. (£5.)—R. IBBOTSON, Knowle, Warwickshire, 4 m., 3 w., 1 d.; s., Knowle King; d., Knowle Princess May; s. of d., Knowle Duke.

II. (£2.)—R. IBBOTSON, 4 m., 3 w., 3 d.; s., Knowle King; d., Knowle Pansy.

PRODUCE.

PRIZES FOR CIDER.

(Open to Growers or Makers.)

First Prize in each Class, a Silver Medal and a Certificate; Second Prize in each Class, a Bronze Medal and a Certificate.

Champion Prize, for Best Exhibit in any of the Classes, a Gold Medal and a Certificate.

(The Cider must have been made in 1897, and each Exhibit in Cask was not less than 18 gallons.)

Cider made in Devon.

CLASS 156.—*Cask of Cider (open to LANDOWNERS only).* [1 entry.]

I. (Silver Medal.)—Sir J. H. H. AMORY, Bart., Knighthayes Court, Tiverton.

CLASS 157.—*12 Bottles of Cider (open to LANDOWNERS only).*
[1 entry.]

I. (Silver Medal.)—Sir J. H. H. AMORY, Bart., Knighthayes Court, Tiverton.

CLASS 158.—*Cask of Cider (open to TENANT FARMERS only).*
[1 entry.]

I. (Silver Medal.)—H. HAYDON, Chettiscombe, Tiverton.

CLASS 159.—*12 Bottles of Cider (open to TENANT FARMERS only).*
[1 entry.]

I. (Silver Medal.)—H. HAYDON, Chettiscombe, Tiverton.]

CLASS 160.—*Cask of Cider (open to CIDER MERCHANTS only).*

[3 entries.]

[No AWARD.]

CLASS 161.—*12 Bottles of Cider (open to CIDER MERCHANTS only).*

[2 entries.]

[No AWARD.]

Cider made in Herefordshire.

CLASS 162.—*Cask of Cider (open to LANDOWNERS only).*

[No ENTRY.]

CLASS 163.—*12 Bottles of Cider (open to LANDOWNERS only).*

[No ENTRY.]

CLASS 164.—*Cask of Cider (open to TENANT FARMERS only).*

[No ENTRY.]

CLASS 165.—*12 Bottles of Cider (open to TENANT FARMERS only).*

[No ENTRY.]

CLASS 166.—*Cask of Cider (open to CIDER MERCHANTS only).*

[No ENTRY.]

CLASS 167.—*12 Bottles of Cider (open to CIDER MERCHANTS only).*

[No ENTRY.]

Cider made in Somerset.

CLASS 168.—*Cask of Cider (open to LANDOWNERS only).* [1 entry.]

[No AWARD.]

CLASS 169.—*12 Bottles of Cider (open to LANDOWNERS only).*

[1 entry.]

C.—J. D. ALLEN, Springfield House, Shepton Mallet.

CLASS 170.—*Cask of Cider (open to TENANT FARMERS only).*

[8 entries.]

I. (Silver Medal.)—W. T. S. TILLEY, East Compton, Shepton Mallet.

II. (Bronze Medal.)—T. PITMAN, Maryland, Galhampton, Bath.

H. C.—W. T. S. TILLEY, East Compton, Shepton Mallet.

C.—J. H. SYMES, Coat Farm, Martock.

CLASS 171.—12 *Bottles of Cider (open to TENANT FARMERS only)*.
[8 entries.]

I. (Silver Medal) and Champion (Gold Medal).—W. T. S. TILLEY, East Compton, Shepton Mallet.

II. (Bronze Medal).—D. J. CROFTS, Sutton Montis, Sparkford.

V. H. C.—R. W. SCOTT, East Lambrook Farm, Kingsbury, South Petherton.

C.—H. TUCKER, Sutton Montis, Sparkford.

CLASS 172.—*Cask of Cider (open to CIDER MERCHANTS only)*.
[2 entries.]

I. (Silver Medal).—W. T. ALLEN, Bradley House, West Bradley, Glastonbury.

CLASS 173.—12 *Bottles of Cider (open to CIDER MERCHANTS only)*.
[2 entries.]

I. (Silver Medal).—W. T. ALLEN, Bradley House, West Bradley, Glastonbury.

Cider made in Counties other than Devon, Herefordshire, or Somerset.

CLASS 174.—*Cask of Cider (open to LANDOWNERS only)*. [1 entry.]

I. (Silver Medal).—H. THOMSON, Newent, Gloucestershire.

CLASS 175.—12 *Bottles of Cider (open to LANDOWNERS only)*.
[1 entry.]

I. (Silver Medal).—R. THOMSON, Newent, Gloucestershire.

CLASS 176.—*Cask of Cider (open to TENANT FARMERS only)*.
[No ENTRY.]

CLASS 177.—12 *Bottles of Cider (open to TENANT FARMERS only)*.
[No ENTRY.]

CLASS 178.—*Cask of Cider (open to CIDER MERCHANTS only)*.
[4 entries.]

[No AWARD.]

CLASS 179.—*Cider (open to CIDER MERCHANTS only)*.
[7 entries.]

No AWARD.]



C H E E S E.

ASS 180.—*Three Cheeses (not less than 56 lbs. each) made in 1897.*
[23 entries.]

I. (£15.)—H. CANNON, Milton Clevedon, Evercreech.

II. (£10.)—T. C. CANDY, Woolcombe Farm, Cattistock, Dorset.

III. (£5.)—R. BRICKER, House Croft Farm, Edington, Westbury, Wilts.

IV. (£3.)—B. J. BUSH, Manor Farm, Laverton, near Bath.

R.—Mrs. W. W. KEEL, Stanton Drew, Somerset.

H. C.—H. FRANCIS, Malkin Hill Farm, Horsington, Bath :—E. T. GREEN, Steeple Ashton, Trowbridge :—and H. H. PICKFORD, Stanton, St. Bernard, Wsey.

C.—H. G. ASHMAN, Beacon Farm, Shepton Mallet :—J. BURFITT, Goodge Farm, North Bruham :—H. J. DAVIS, Hurlingpot, Doulling, Shepton Mallet :—J. HOULBROOK, Beech House, Darnhall, Winsford :—and S. E. CHARDS, Coldcot Farm, Stourton, Bath.

CLASS 181.—*Three Cheddar Cheeses (not less than 28 lbs. each) made in 1897 by a Student who had received not less than a week's instruction in one of the Society's Cheese Schools.* [11 entries.]

I. (£8.)—Miss A. SAGE, Batcombe, Evercreech.

II. (£5.)—Mrs. E. COLLINS, Longhouse Farm, Oldford, Frome.

III. (£3.)—Miss L. MILLARD, Theale, Wedmore, Weston-super-Mare.

IV. (£2.)—E. A. H. BURFITT, Goodedge Farm, North Bruham, Bruton.

R.—Mrs. T. J. GIDDINGS, Manor Farm Dairy, Chilcompton, Bath.

C.—Miss M. PARFITT, Spargrove, Evercreech, Bath.

CLASS 182.—*Three Cheeses (not less than 28 lbs. each) made in 1898.*
[20 entries.]

I. (£8.)—H. E. TUCKER, Church Farm, Steeple Ashton, Trowbridge.

II. (£5.)—H. CANNON, Milton Clevedon, Evercreech.

III. (£3.)—Miss A. SAGE, Batcombe, Evercreech.

IV. (£2.)—Mrs. T. J. GIDDINGS, Manor Dairy, Chilcompton, Bath.

R.—E. T. GREEN, Whatcombe Farm, Frome.

C.—E. T. GREEN, Steeple Ashton, Trowbridge.

CLASS 183.—*Three Cheddar Cheeses (not less than 28 lbs. each) made in 1898 by a Student who had received not less than a week's instruction in one of the Society's Cheese Schools.* [13 entries.]

I. (£6.)—Miss A. SAGE, Batcombe, Evercreech.

II. (£4.)—Mrs. W. T. S. TILLEY, East Compton, Shepton Mallet.

III. (£2.)—Mrs. R. A. PERRY, Row Farm, Laverton, Bath.

IV. (£1.)—Mrs. T. J. GIDDINGS, Manor Dairy, Chilcompton, Bath.

C.—J. BOARD, East Pennard, Shepton Mallet :—and Mrs. A. M. CREIGHTON, Arncombe Farm, Shepton Mallet.

CLASS 184.—*Eight Loaf or other Truckle Cheeses made in 1898.*
[11 entries.]

- I. (£5.)—W. C. SPENCER, Hooke, Beaminster.
- II. (£3.)—H. H. PICKFORD, Stanton St. Bernard, Pewsey.
- III. (£2.)—H. CANNON, Milton Clevedon, Evercreech.
- IV. (£1.)—E. M. COLES, Manor Farm, Emborough, Bath.
- R.—F. W. J. CROCKER, Redford Farm, Batcombe, Cattistock, Dorset.

CLASS 185.—*Three Caerphilly Cheeses made in 1898.* [9 entries.]

- I. (£3.)—J. BOARD, East Pennard, Shepton Mallet.
- II. (£2.)—Mrs. W. T. S. TILLEY, East Compton, Shepton Mallet.
- III. (£1.)—J. E. HAWKINGS, Berrow, Burnham.
- IV. (10s.)—Mrs. P. HARRIS, Warren Farm, Brean, Bridgwater.

CLASS 186.—*56 lbs. of Caerphilly Cheese, made in Glamorganshire or Monmouthshire.* [3 entries.]

(Given by the Cardiff Local Committee.)

- I. (£4.)—W. THOMAS, Little Colebrook, Cadoxton.
- II. (£3.)—R. THOMAS, Llangattog Farm, Llanedarne, near Cardiff.
- R.—Miss A. DUTHIE, The Ford, Langstone, near Caerleon.

CLASS 187.—*Three Cream or other Soft Cheeses.* [7 entries.]

- I. (£3.)—Major-Gen. H. H. LEE, The Mount, Dinas Powis.
- II. (£2.)—Mrs. F. C. LOXTON, The Creamery, St. James's Square, Bath.
- R.—Mrs. F. C. LOXTON.

BUTTER AND CREAM.

(These Classes were not open to Professional Teachers.)

CLASS 188.—*3 lbs. of Fresh (or very slightly salted) Butter, made of Cream from Cows other than Channel Island Breeds.* [28 entries.]

- I. (£4.)—C. HAYES, Keyford House Farm, Frome.
- II. (£3.)—A. GIBBS, Tyntesfield, Bristol.
- III. (£2.)—LORD POLTIMORE, Poltimore Park, Exeter.
- IV. (£1.)—Mrs. W. WEBSTER, The Hermitage, Stockton-on-Forest, near York.
- V. H. C.—Mrs. L. CULLIMORE, Lower Stone, near Falfield, Gloucester.
- H. C.—Mrs. F. C. LOXTON, The Creamery, St. James's Square, Bath :—and Mrs. J. E. SHEPHERD, Butcombe, near Wrington.
- C.—Mrs. J. MORGAN, Tynewydd, Llandefeilog, Kidwelly.

CLASS 189.—3 *lbs. of Fresh (or very slightly salted) Butter, made of Cream from Cows of Channel Island Breeds only.* [20 entries.]

I. (£4).—A. GIBBS, Tyntesfield, Bristol.

II. (£3) and Special (£1.)*—LORD POLTIMORE, Poltimore Park, Exeter.

III. (£2).—Mrs. T. EMERY, Elm Tree Farm, Portbury, Bristol.

IV. (£1).—W. B. RODERICK, Fronheulog, Llanelly.

R.—Mrs. C. McINTOSH, Havering Park, Romford.

V. H. C.—A. F. SOMERVILLE, Home Dairy Farm, Dinder, Wells.

H. C.—C. E. KEYSER, Aldermaston Court, Reading :—and Major-General I. H. LEE, The Mount, Dinas Powis.

C.—DUKE OF MARLBOROUGH, Blenheim Palace, Woodstock :—and EARL OF ROSEBERY, K.G., Mentmore, Leighton Buzzard.

CLASS 190.—3 *lbs. of Fresh (or very slightly salted) Butter, made from Scalded Cream.* [23 entries.]

I. (£4) and Special (£1.)*—LORD POLTIMORE, Poltimore Park, Exeter.

II. (£3).—LORD ROTHSCHILD, Tring Park, Tring.

III. (£2).—A. F. SOMERVILLE, Home Dairy Farm, Dinder, Wells.

IV. (£1).—Mrs. J. H. PHILLIPS, Winsford Dairy, Bideford.

R.—EARL OF ROSEBERY, K.G., Mentmore, Leighton Buzzard.

V. H. C.—Mrs. C. McINTOSH, Havering Park, Romford.

H. C.—J. C. FORSTER, Clatford Mills, Andover :—and M. J. WILLIAMS, Regilbury Court, Winford.

C.—Mrs. T. EMERY, Elm Tree Farm, Portbury, Bristol :—and C. E. KEYSER, Aldermaston Court, Reading.

CLASS 191.—3 *lbs. of Butter, to which no salt whatever has been added.* [27 entries.]

I. (£4) and Special (£1.)*—LORD POLTIMORE, Poltimore Park, Exeter.

II. (£3).—C. E. KEYSER, Aldermaston Court, Reading.

III. (£2).—A. F. SOMERVILLE, Home Dairy Farm, Dinder, Wells.

IV. (£1).—W. B. RODERICK, Fronheulog, Llanelly.

R.—Miss M. K. HARRIS, Brownsell Farm, Stourton Caundle, Stalbridge.

V. H. C.—A. GIBBS, Tyntesfield, Bristol :—and C. HAYES, Keyford House Farm, Frome.

H. C.—S. F. BERRY, Old Wellbury, Hitchin :—and Mrs. C. McINTOSH, Havering Park, Romford.

C.—LORD ROTHSCHILD, Tring Park, Tring.

* Three Special Prizes of £1 each were given for Butter, which had the best keeping qualities, exhibited in Class 188, 189, 190, or 191. 1 lb. was taken on the first day of the Show from each Prize Lot of Butter in the Classes named, and was judged on the last day of the Show.

Prizes awarded for Butter-Making.

CLASS 192.—*12 lbs. of Salted Butter, in a jar or crock, delivered to the Secretary four weeks before the Show.* [17 entries.]

- I. (£4.)—A. GIBBS, Tyntesfield, Bristol.
- II. (£3.)—Mrs. F. C. LOXTON, The Creamery, St. James's Square, Bath.
- III. (£2.)—N. TODD, Okeford Fitzpaine, Blandford.
- IV. (£1.)—Mrs. J. MORGAN, Tynewydd, Llandefeilog, Kidwelly.
- H. C.—M. J. WILLIAMS, Regilbury Court, Winford.
- C.—Mrs. O. T. JENKINS, The Grove, Manorbier, R.S.O.:—and H. SMITH, Insh House Farm, Pilning, Bristol.

CLASS 193.—*Four half-pounds of Clotted or Devonshire Cream.*
[9 entries.]

- I. (£3.)—Mrs. J. H. PHILLIPS, Winsford Dairy, Bidford.
- II. (£2.)—W. BEER, Trinity Dairy, Barnstaple.
- III. (£1.)—Mrs. J. TRUMP, Fordton House, Whimble, Exeter.
- IV. (10s.)—A. GIBBS, Tyntesfield, Bristol.
- R.—E. KIDNER, Park Farm, Cannington, Bridgwater.

BUTTER-MAKING COMPETITIONS.

Professional Teachers, Makers or Vendors of Churns, or persons in any way representing the interests of Makers or Vendors of Churns, were not eligible to compete in the Butter-making Classes; and this Regulation was strictly enforced.

A previous winner of the Society's Champion Gold Medal was not eligible to compete in any of the Butter-making Classes.

(These Prizes were awarded for the Best and Largest quantity of Butter made from a given quantity of Cream in the cleanest and most approved method.)

CLASS 194.—*On the first day of the Show, open to any Dairymaid (not residing with or employed by her parents) working for wages not exceeding £20 a year.* [7 entries.]

- I. (£4.)—Miss N. THATCHER, Burrington Farm, Burrington, Bristol.
- II. (£3.)—Miss L. WALKER, Whittock's End, Dymock.
- III. (£2.)—Miss E. M. A. CROOK, Mentmore Dairy, Leighton Buzzard.
- R.—Mrs. N. COMER, Surrenden Dairy, Pluckley, Ashford, Kent.
- H. C.—Mrs. A. HODGE, Charlton Farm, Portbury.
- F. C.—Miss M. J. MORRIS, Perthyre Farm, Rockfield, Monmouth.

CLASS 195.—*On the second day of the Show, open to any Man or Woman who has never won a First Prize in any open Butter-making Competition.* [28 entries.]

- I. (£4.)—Miss L. BRANDON, The Dairy House, Eccleshall, Staffs.
- II. (£3.)—Miss M. J. CAMP, Highfields Farm, Etwell, Derby.

- III. (£2.)**—Miss N. THATCHER, Burrington Farm, Burrington, Bristol.
IV. (£1.)—Miss L. WALKER, Whittock's End, Dymock.
R.—Mrs. A. HODGE, Charlton Farm, Portbury.
V. H. C.—Mrs. B. C. BIRD, Priddy Hill, near Wells, Somerset :—and Miss E. M. Cox, Pwlpen, Christchurch, near Newport, Mon.
H. C.—Miss J. LOUGHER, Sheep Court, Bonvilstone, Cardiff :—and Miss M. SMITH, Rydon Mills, Woodbury.
C.—Miss A. BIDDLE, Laurel House, St. Arvans, Chepstow :—Miss J. JAMES, Whitton Rosser, Llancarfan, Cowbridge :—and Miss M. LOUGHER, Sheep Court, Bonvilstone, Cardiff.

CLASS 196.—On the third day of the Show, open to any Woman.
 [38 entries.]

- I. (£4.)**—Miss N. THATCHER, Burrington Farm, Burrington, Bristol.
II. (£3.)—Mrs. N. COMER, Surrenden Dairy, Pluckley, Ashford, Kent.
III. (£2.)—Miss A. BIDDLE, Laurel House, St. Arvans, Chepstow.
IV. (£1.)—Miss J. JAMES, Whitton Rosser, Llancarfan, Cowbridge.
R.—Miss M. CLANDY, The Mount, Dinas Powis.
V. H. C.—Miss L. BRINDLEY, Farley, near Cheadle, Staffs :—Miss J. LOUGHER, Sheep Court, Bonvilstone, near Cardiff :—and Miss A. B. WALKER, Dog Kennel Farm, Hitchin.
H. C.—Mrs. L. BRANDON, The Dairy House, Eccleshall, Staffs :—Miss M. COLE, Home Farm, Tring, Herts :—Miss E. G. COOK, Clock House Farm, Ashford, Middlesex :—Miss C. F. HUGHES, Llancarfan Vicarage, near Cowbridge :—and Miss L. WALKER, Whittock's End, Dymock.
C.—Miss B. C. BIRD, Priddy Hill, near Wells, Somerset :—Miss M. K. HARRIS, Brownsell Farm, Stourton Caundle, Stalbridge :—Miss E. M. COX, Slough Farm, Caerwent, near Chepstow :—Miss A. LAWRENCE, Home Dairy Farm, Dinder, Wells :—and Mrs. F. C. LOXTON, The Creamery, James's Square, Bath.

CLASS 197.—On the fourth day of the Show, open to any Man or Woman, except the Winner of the 1st Prize in Class 196. [30 entries.]

- I. (£4.)**—Miss C. F. HUGHES, Llancarfan Vicarage, near Cowbridge.
II. (£3.)—Miss L. BRINDLEY, Farley, near Cheadle, Staffs.
III. (£2.)—Miss L. BRANDON, The Dairy House, Eccleshall, Staffs.
IV. (£1.)—Mrs. F. C. LOXTON, The Creamery, St. James's Square, Bath.
R.—Miss A. BIDDLE, Laurel House, St. Arvans, Chepstow.
V. H. C.—Mrs. B. C. BIRD, Priddy Hill, near Wells, Somerset :—Miss G. COOK, Clock House Farm, Ashford, Middlesex :—Miss E. M. A. CROOK, Antmore Dairy, Leighton Buzzard :—and Miss J. JAMES, Whitton Rosser, Llancarfan, Cowbridge.
H. C.—Miss M. J. CAMP, Highfields Farm, Etwall, Derby :—Miss F. S. COX, Pwlpen, Christchurch, near Newport, Mon. :—and Miss M. K. HARRIS, Brownsell Farm, Stourton Caundle, Stalbridge.
C.—Miss E. M. Cox, Pwlpen, Christchurch, near Newport, Mon. :—Mrs. HODGE, Charlton Farm, Portbury :—and Miss A. B. WALKER, Dog Kennel Farm, Hitchin.

CHAMPION PRIZES.

On the fifth day of the Show the Winners of Prizes in Classes 194, 195, 196, and 197 competed for :—

I. (A Gold Medal, and the Society's Certificate.)—Miss L. BRANDON.

II. (A Silver Medal, and the Society's Certificate.)—Miss E. M. A. CROOK.

III. (A Bronze Medal, and the Society's Certificate.)—Miss L. BRINDLEY.

R.—Mrs. COMER.

H. C.—All remaining Competitors.

MILKING COMPETITION.

CLASS 198.—*For Men twenty years of age and over.* [8 entries.]

I. (£1 10s.)—J. FRICKER, jun., Burton, Mere, Wilts.

II. (£1.)—E. MILWARD, Ball Cottage, Rumney, Cardiff.

III. (15s.)—E. M. COLES, Manor Farm, Emborough, Bath.

IV. (10s.)—G. AMOUR, All Cannings, Devizes.

H. C.—A. APPERLEY, Maindy Farm, Penycodcae, near Pontypridd.

CLASS 199.—*For Women.* [7 entries.]

I. (£1 10s.)—Miss J. JAMES, Whitton Rosser, Llancarfan, Cowbridge.

II. (£1.)—Miss M. REED, Alexander House, Swansea.

III. (15s.)—Miss M. CLANDY, The Mount, Dinas Powis.

IV. (10s.)—Miss A. DICK, The Grange, Chepstow, Mon.

H. C.—Mrs. N. COMER, Surrenden Dairy, Pluckley, Ashford, Kent:—and Mrs. F. A. SAGE, Tyla Manor, Castleton, Cardiff.

CLASS 200.—*For Youths under twenty years of age.* [2 entries.]

I. (£1 10s.)—E. W. COLES, Manor Farm, Emborough, Bath.

II. (£1.)—T. MILES, Berthlwyd Farm, Treharris.

HORSE-SHOEING COMPETITION.

The Registration Committee of the Farriers' Company admitted the Winners of First Prizes in these Competitions to the Official Register *free of charge*, on their satisfying the Judges that they had a fair knowledge of the structure of the horse's foot, and on the necessary application being made to the Company in the prescribed form.

CLASS 201.—*Best Shoeing of a Nag Horse by a Smith on the third day of the Show.* [40 entries.]

I. (£5.)—M. GRIFFITHS, R.S.S., Cross Inn, Golden Grove, R.S.O.

II. (£3.)—W. D. LANE, R.S.S., Llanvetherne, near Abergavenny.

III. (£2.)—J. ISAAC, Cambrian Forge, Carmarthen.

IV. (£1.)—E. PROSSER, R.S.S., Senny Bridge, Brecon.

R. & V. H. C.—W. PRICE, Nelson, Glamorganshire.

V. H. C.—S. W. GALLOP, Chew Magna, Bristol :—J. HARRIES, Rhydodin, Llangunnor, Carmarthen :—D. LLOYD, Dolygarreg Lodge, Llanwrda, South Wales :—E. OWEN, 9, Club Houses, Merthyr Tydvil :—and J. REECE, 10, Chapel Bridge Terrace, Cwmcarn, near Newport.

H. C.—A. RUDGE, Brampton, Madley, Herefordshire :—and F. WEAVER, Paul Street Shoeing Forge, Taunton.

C.—E. BROOMFIELD, 5, Church Gates, Weston, Bath :—R. DEWEY, Monhead St. Andrew :—W. HANCOCKS, Kingstone, Herefordshire :—G. JONES, R.S.S., Smith's Shop, The Hendre, Monmouth :—T. REES, Long Row, Nelson :—and R. WHITE, 2, Leckwith Road, Canton, Cardiff.

CLASS 202.—Best Shoeing of a Cart Horse by a Smith on the fourth day of the Show. [41 entries.]

I. (£5.)—P. L. WILLIAMS, 26, John Street, Porth.

II. (£3.)—E. OWEN, 9, Club Houses, Merthyr Tydvil.

III. (£2.)—W. PRICE, Nelson, Glamorgan.

IV. (£1.)—J. HARRIES, Rhydodin, Llangunnor, Carmarthen.

R. & V. H. C.—W. D. LANE, R.S.S., Llanvetherne, near Abergavenny.

V. H. C.—B. DAVIES, R.S.S., Ebbw Vale Stables, Ebbw Vale, Mon. :—J. GRIFFITHS, R.S.S., Cross Inn, Golden Grove, R.S.O. :—J. REECE, 10, Chapel Bridge Terrace, Cwmcarn, near Newport :—T. REES, Long Row, Nelson :—F. WEAVER, Paul Street Shoeing Forge, Taunton :—and R. WHITE, 2, Leckwith Road, Canton, Cardiff.

H. C.—W. DENNER, R.S.S., Fore Street, Cullompton :—H. J. HANNEY, R.S.S., 10, Roberts Road, Cwmtillery, Mon. :—G. JONES, R.S.S., Smith's Shop, The Hendre, Monmouth :—D. LLOYD, Dolygarreg Lodge, Llanwrda, South Wales :—and J. OWEN, R.S.S., Buckland Forge, Bwlch, R.S.O.

C.—E. BROOMFIELD, 5, Church Gates, Weston, Bath :—J. DAVIES, Smith's Forge, Mountain Ash :—S. W. GALLOP, Chew Magna, Bristol :—T. PITT, 7, Thomas Street, Newport, Mon. :—E. PROSSER, R.S.S., Senny Bridge, near Brecon :—and T. WILLIAMS, New Inn Forge, Mountain Ash.

POULTRY.

CLASS 1.—COCHIN, COCK. [1 entry.]

III. (10s.)—VISCOUNT DEERHURST.

CLASS 2.—COCHIN, HEN. [1 entry.]

III. (10s.)—VISCOUNT DEERHURST.

CLASS 3.—BRAHMA, COCK. [9 entries.]

I. (£1 10s.)—G. W. HENSHALL.

II. (15s.)—S. W. THOMAS.

III. (10s.)—G. W. HENSHALL.

V. H. C.—G. W. HENSHALL :—J. F. HILL :—and Mrs. I. I. WILLIAMS.

CLASS 4.—BRAHMA, HEN. [5 entries.]

I. (£1 10s.)—G. W. HENSHALL.

II. (15s.)—S. W. THOMAS.

V. H. C.—Mrs. I. I. WILLIAMS.

H. C.—Mrs. SPERLING :—and Mrs. I. I. WILLIAMS.

CLASS 5.—LANGSHAN, COCK. [8 entries.]

I. (£1 10s.)—J. HILL.

II. (15s.)—C. SEABROOKE.

III. (10s.)—V. G. HUNTLEY.

V. H. C.—E. COVENTRY.

H. C.—A. M. MADDOCK.

CLASS 6.—LANGSHAN, HEN. [7 entries.]

I. (£1 10s.)—A. HODDINOTT.

II. (15s.)—C. SEABROOKE.

III. (10s.)—VISCOUNT DEERHURST.

V. H. C.—V. G. HUNTLEY.

H. C.—W. H. CRANE :—and J. HILL.

CLASS 7.—PLYMOUTH ROCK, COCK. [12 entries.]

I. (£1 10s.)—J. SANDERCOCK.

II. (15s.)—J. M. TREZISE.

III. (10s.)—F. PORTER.

V. H. C.—J. H. DAVIS :—and A. POLY-DIDIER.

H. C.—A. and S. DONKIN.

CLASS 8.—PLYMOUTH ROCK, HEN. [10 entries.]

I. (£1 10s.)—J. H. DAVIS.

II. (15s.)—J. H. WAY.

III. (10s.)—S. W. THOMAS.

V. H. C.—W. E. DAINTON :—and A. POLY-DIDIER.

H. C.—A. and S. DONKIN :—and J. M. TREZISE.

CLASS 9.—WYANDOTTE, COCK. [14 entries.]

I. (£1 10s.)—BOADEN and THOMAS.

II. (15s.)—BOADEN and THOMAS.

III. (10s.)—C. PRESTON.

V. H. C.—VISCOUNT DEERHURST :—and Mrs. PIERSON.

H. C.—F. GREEN :—J. and T. HAY :—H. PICKLES :—Mrs. PIERSON :—and C. SEABROOKE.

Prizes awarded for Poultry.

lv

CLASS 10.—WYANDOTTE, HEN. [12 entries.]

£1 10s.)—BOADEN and THOMAS.

(15s.)—F. STOODLEY.

(10s.)—C. PRESTON.

H. C.—VISCOUNT DEERHURST :—F. GREEN :—and H. PICKLES.

C.—F. GREEN.

CLASS 11.—ORPINGTON, COCK. [10 entries.]

(£1 10s.)—R. DE C. PEEL.

(15s.)—J. F. HILL.

L. (10s.)—S. W. THOMAS.

H. C.—W. COOK and SONS :—and V. G. HUNTLEY.

C.—R. H. DAVIES.

CLASS 12.—ORPINGTON, HEN. [9 entries.]

(£1 10s.)—H. JACKSON.

(15s.)—R. DE C. PEEL.

L. (10s.)—J. DAVIES.

H. C.—C. E. WARING.

C.—W. COOK and SONS.

CLASS 13.—MINORCA, COCK. [10 entries.]

(£1 10s.)—A. G. PITTS.

(15s.)—L. HAKE.

L. (10s.)—H. HILL.

H. C.—FURSLAND BROS. :—and A. G. PITTS.

CLASS 14.—MINORCA, HEN. [13 entries.]

(£1 10s.)—L. HAKE.

(15s.)—A. G. PITTS.

L. (10s.)—J. RISDON.

H. C.—FURSLAND BROS. :—J. C. LAMACRAFT :—and A. G. PITTS.

C.—S. NASH :—and H. T. SILCOX.

CLASS 15.—LEGHORN, COCK. [5 entries.]

(£1 10s.)—J. A. BOOTH, *white*.

L. (15s.)—G. F. HIGGINSON.

H. C.—J. BRADFORD :—and Mrs. LISTER KAY.

CLASS 16.—LEGHORN, HEN. [6 entries.]

- I. (£1 10s.)—**Mrs. LISTER KAY.
- II. (15s.)—**J. BRADFORD.
- III. (10s.)—**G. F. HIGGINSON.
- V. H. C.—**J. A. BOOTH, *white*:—and E. L. SIMON.

CLASS 17.—HAMBURG, COCK. [8 entries.]

- I. (£1 10s.)—**H. PICKLES.
- II. (15s.)—**A. DE WINTON.
- III. (10s.)—**G. DOBLE.
- V. H. C.—**G. DOBLE.
- H. C.—**J. RICHARDSON:—and J. WHITE.

CLASS 18.—HAMBURG, HEN. [8 entries.]

- I. (£1 10s.)—**G. DOBLE.
- II. (15s.)—**H. PICKLES.
- III. (10s.)—**H. RICHENS.
- V. H. C.—**D. W. LEWIS:—and W. SNELL.
- H. C.—**J. AUCLAND:—and R. P. INSALL.

CLASS 19.—DORKING (COLOURED), COCK. [10 entries.]

- I. (£1 10s.)—**H. REEVES.
- II. (15s.)—**R. MORRIS.
- III. (10s.)—**G. W. JONES.
- V. H. C.—**Captain G. PHIPPS HORNBY.
- H. C.—**T. HULSE:—A. LUCKIN:—and A. C. MAJOR.

CLASS 20.—DORKING (COLOURED), HEN. [14 entries.]

- I. (£1 10s.)—**H. REEVES.
- II. (15s.)—**A. K. CRICHTON.
- III. (10s.)—**T. HULSE.
- V. H. C.—**G. L. FOSTER-HARTER:—W. V. HOWELL-THOMAS:—and A. LUCKIN.
- H. C.—**J. and T. HAY:—Captain G. PHIPPS HORNBY:—and C. LUCKIN.

CLASS 21.—DORKING (SILVER GREY), COCK. [6 entries.]

- I. (£1 10s.)—**J. BLUNDELL.
- II. (15s.)—**O. E. CRESSWELL.
- III. (10s.)—**A. C. MAJOR.

V. H. C.—H. REEVES.

H. C.—Captain G. PHIPPS HORNBY.

CLASS 22.—DORKING (SILVER GREY), HEN. [7 entries.]

I. (£1 10s.)—H. REEVES.

II. (15s.)—J. BLUNDELL.

III. (10s.)—O. E. CRESSWELL.

H. C.—Captain G. PHIPPS HORNBY :—and Mrs. SPERLING.

CLASS 23.—DORKING (WHITE OR CUCKOO), COCK. [6 entries.]

I. (£1 10s.)—S. W. BENNETT, *white*.

II. (15s.)—O. E. CRESSWELL, *white*.

III. (10s.)—J. J. G. WOODCOCK, *white*.

C.—Miss BETTON, *white*.

CLASS 24.—DORKING (WHITE OR CUCKOO), HEN. [5 entries.]

I. (£1 10s.)—O. E. CRESSWELL, *white*.

II. (15s.)—J. J. G. WOODCOCK, *white*.

V. H. C.—A. C. MAJOR, *cuckoo*.

H. C.—O. E. CRESSWELL, *white*.

CLASS 25.—OLD ENGLISH GAME, COCK. [6 entries.]

I. (£1 10s.)—W. H. LEWIS.

II. (15s.)—W. NIXON.

III. (10s.)—T. GARNER.

CLASS 26.—OLD ENGLISH GAME, HEN. [11 entries.]

I. (£1 10s.)—T. GARNER.

II. (15s.)—J. D. T. PARSONS, jun.

III. (10s.)—W. NIXON.

V. H. C.—O. HYETT.

H. C.—T. GARNER :—F. MARSON :—E. NELMES :—and J. D. T. PARSONS, jun.

CLASS 27.—INDIAN GAME, COCK. [12 entries.]

I. (£1 10s.)—JOHN FRAYN.

II. (15s.)—JAMES FRAYNE.

III. (10s.)—W. BRENT.

V. H. C.—W. E. and E. J. MARSHALL.

H. C.—W. K. CLEMENTS :—COOPER, COOPER and Co :—G. L. FOSTER HARTER :—J. ROBERTS :—and Mrs. A. H. STONE.

CLASS 28.—INDIAN GAME, HEN. [8 entries.]

- I. (£1 10s.)—JOHN FRAYN.
 II. (15s.)—JAMES FRAYNE.
 III. (10s.)—W. BRENT.
 H. C.—J. KITCHEN :—and W. E. and E. J. MARSHALL.

CLASS 29.—MALAY, COCK. [4 entries.]

- I. (£1 10s.)—JOHN FRAYN.
 II. (15s.)—G. F. WARD.
 H. C.—R. DE C. PEEL.

CLASS 30.—MALAY, HEN. [1 entry.]

- I. (£1 10s.)—R. DE C. PEEL.

CLASS 31.—FRENCH, COCK. [2 entries.]

- I. (£1 10s.)—S. W. THOMAS.

CLASS 32.—FRENCH, HEN. [2 entries.]

- I. (£1 10s.)—S. W. THOMAS.

CLASS 33.—ANY OTHER DISTINCT BREED (NOT PREVIOUSLY MENTIONED), COCK. [8 entries.]

- I. (£1 10s.)—F. PORTER, *Andalusian*.
 II. (15s.)—C. PAYNE, *brown red Game*.
 III. (10s.)—G. DOBLE, *white Rosecomb*.
 H. C.—C. PAYNE, *brown red Game*.
 C.—VISCOUNT DEERHURST, *Silkie* :—and D. W. LEWIS, *Polish*.

CLASS 34.—ANY OTHER DISTINCT BREED (NOT PREVIOUSLY MENTIONED), HEN. [8 entries.]

- I. (£1 10s.)—C. PAYNE, *brown red Game*.
 II. (15s.)—F. PORTER, *Andalusian*.
 III. (10s.)—J. AUCKLAND, *black Spanish*.

SPECIAL PRIZES.

(Offered by Captain J. C. Best.)

- CLASS 35.—SILVER GREY DORKING, COCK AND SIX HENS, bred in 1897 or 1898, the Property of one Exhibitor. (The Birds to be exhibited in an open run.) 1st prize, £5; 2nd prize, £3; 3rd prize, £2. [1 entry.]

[No EXHIBIT.]

CHICKENS OF 1898.

CLASS 36.—COCHIN, BRAHMA, LANGSHAN, PLYMOUTH ROCK, WYANDOTTE, OR ORPINGTON, COCKEREL. [10 entries.]

I. (£1 10s.)—BOADEN and THOMAS, *Wyandotte*.

II. (15s.)—R. DE C. PEEL, *buff Rock*, Jan. 3rd.

III. (10s.)—J. A. SLATTER, *Cochin*, Jan.

H. C.—L. and T. FAWKES, Jan. 15th :—and M. G. GOLDSMITH, *gold Wyandotte*, Jan. 2nd.

C.—VISCOUNT DEERHURST, *silver Wyandotte*, Jan. 4th.

CLASS 37.—COCHIN, BRAHMA, LANGSHAN, PLYMOUTH ROCK, WYANDOTTE, OR ORPINGTON, PULLET. [14 entries.]

I. (£1 10s.)—W. HOLMAN, *silver Wyandotte*, Jan. 3rd.

II. (15s.)—L. and T. FAWKES, Jan. 15th.

III. (10s.)—J. WHEELER, *Plymouth Rock*.

H. C.—A. S. EDMUNDS, *silver Wyandotte*, Jan. 4th :—and R. DE C. PEEL, *buff Rock*.

CLASS 38.—MINORCA, LEGHORN, HAMBURG, OR FRENCH, COCKEREL. [4 entries.]

I. (£1 10s.)—H. HILL, *Minorca*, Jan. 2nd.

II. (15s.)—S. FRIEND, *Minorca*, Jan. 1st.

H. C.—L. and T. FAWKES, Jan. 12th :—and S. W. THOMAS, *French*, Feb.

CLASS 39.—MINORCA, LEGHORN, HAMBURG, OR FRENCH, PULLET. [6 entries.]

I. (£1 10s.)—S. FRIEND, *Minorca*, Jan. 1st.

II. (15s.)—A. RANSOM, *white Leghorn*, Jan. 16th.

III. (10s.)—S. W. THOMAS, *French*, Jan.

H. C.—J. W. CROSSMAN, *Minorca*, Jan. 2nd.

CLASS 40.—DORKING, GAME, MALAY, OR ANY OTHER DISTINCT BREED (NOT PREVIOUSLY MENTIONED), COCKEREL. [4 entries.]

I. (£1 10s.)—JAS. FRAYNE, *Indian Game*, Jan.

II. (15s.)—C. LUCKIN, *coloured Dorking*, Jan. 8th.

CLASS 41.—DORKING, GAME, MALAY, OR ANY OTHER DISTINCT BREED (NOT PREVIOUSLY MENTIONED), PULLET. [10 entries.]

I. (£1 10s.)—JAMES FRAYNE, *Indian Game*, Jan.

II. (15s.)—J. EDWARDS, *Game*, Jan. 7th.

III. (10s.)—J. M. STOCKBRIDGE, *silver grey Dorking*, Jan. 3rd.

H. C.—W. BRENT, *Indian Game*.

LIVE TABLE POULTRY.

CLASS 42.—PAIR OF COCKERELS OF 1898, OF ANY PURE BREED. [5 entries.]

I. (£1 10s.)—Capt. G. PHIPPS HORNBY, *Dorking*, Jan.

II. (15s.)—W. E. and E. J. MARSHALL, *Indian Game*, Jan. 2nd.

CLASS 43.—PAIR OF PULLETS OF 1898, OF ANY PURE BREED. [7 entries.]

I. (£1 10s.) and Special.*—JAS. FRAYNE, *Indian Game*, Jan.

II. (15s.)—H. REEVES, *Dorkings*, Jan. 2nd.

III. (10s.)—Capt. G. PHIPPS HORNBY, *Dorkings*, Jan.

CLASS 44.—PAIR OF COCKERELS OF 1898, OF A FIRST CROSS FROM ANY PURE BREEDS. [3 entries.]

I. (£1 10s.)—H. HILL, *Indian Game-Dorking*, Jan. 14th.

II. (15s.)—D. MATHER, *Old English Game-Dorking*, Jan. 13th.

CLASS 45.—PAIR OF PULLETS OF 1898, OF A FIRST CROSS FROM ANY PURE BREEDS. [5 entries.]

I. (£1 10s.)—H. HILL, *Indian Game-Dorking*, Jan. 14th.

II. (15s.)—W. J. ABREY, *Indian Game-Dorking*, Jan. 16th.

SELLING CLASSES.

CLASS 46.—ANY DISTINCT BREED, COCK (PRICE NOT TO EXCEED £1 1s.). [14 entries.]

I. (£1 10s.)—D. W. LEWIS, *Hamburgh*.

II. (15s.)—N. K. WENTWORTH, *black Minorca*.

III. (10s.)—J. BLUNDELL, *Dorking*.

V. H. C.—J. ENGLAND, *Orpington*.

H. C.—C. FORD, *Dorking*:—and A. E. MORGAN, *Cochin*.

CLASS 47.—ANY DISTINCT BREED, HEN (PRICE NOT TO EXCEED £1 1s.). [14 entries.]

I. (£1 10s.)—J. KITCHEN, *Indian Game*.

II. (15s.)—H. HILL, *Indian Game*.

III. (10s.)—W. E. DAINTON.

V. H. C.—A. E. MORGAN, *Cochin*.

* Silver Cup, given by Mr. W. B. Tegetmeier, for the Best Pair of Cockerels or Pullets in Class 42, 43, 44, or 45.

H. C.—**J. AUCLAND**, *black Spanish*:—**W. H. CRANE**, *Plymouth Rock*:—**FORD**, *Dorking*:—**W. V. HOWELL-THOMAS**, *coloured Dorking*:—**J. C. AMACRAFT**:—**D. W. LEWIS**, *Hamburgh*:—and **A. E. MORGAN**, *Cochin*.

BANTAMS.

CLASS 46.—**BLACK ROSECOMB**—**COCK OR HEN, COCKEREL OR PULLET**, THE PROPERTY OF AN EXHIBITOR RESIDING WITHIN SEVEN MILES OF THE TOWN HALL, CARDIFF. [5 entries.]

(The Prizes in Class 46 were given by Mr. A. E. Morgan.)

I. (12s.)—**A. E. MORGAN**.

II. (8s.)—**A. E. MORGAN**.

V. H. C.—**A. E. MORGAN**:—and **F. W. RIMER**.

DUCKS, GEESE, AND TURKEYS.

CLASS 49.—**DRAKE OR DUCK (AYLESBURY)**. [8 entries.]

I. (£1 10s.)—**F. READ**.

II. (15s.)—**F. READ**.

III. (10s.)—**L. FORESTIER-WALKER**.

V. H. C.—**L. FORESTIER-WALKER**.

H. C.—**W. PICKARD**.

CLASS 50.—**DRAKE OR DUCK (ROUEN)**. [11 entries.]

I. (£1 10s.)—**V. G. HUNTLEY**.

II. (£15s.)—**V. G. HUNTLEY**.

III. (10s.)—**E. TURNER**.

V. H. C.—**W. COOK and SONS**:—**J. COX**:—and **V. G. HUNTLEY**.

CLASS 51.—**DRAKE OR DUCK (PEKIN)**. [9 entries.]

I. (£1 10s.)—**J. F. HILL**.

II. (15s.)—**MISS BROWN**.

III. (10s.)—**REV. W. HURST, M.A.**

V. H. C.—**MISS BROWN**:—and **J. R. R. MITCHELL**.

H. C.—**J. DAVIES**:—and **O. PHILLIPS**.

CLASS 52.—**GANDER**. [10 entries.]

I. (£1 10s.)—**J. H. DAVIS**.

II. (15s.)—**MRS. J. TAYLOR**.

III. (10s.)—**A. COOKE**.

V. H. C.—**L. FORESTIER-WALKER**:—and **J. R. R. MITCHELL**.

H. C.—**L. FORESTIER-WALKER**:—**R. JEREMIAH**:—and **W. G. WATTS**.

CLASS 53.—GOOSE. [7 entries.]

- I (£1 10s.)—W. E. DANTON.**
- II (15s.)—J. H. DAVIS.**
- III (10s.)—J. R. R. MITCHELL.**
- V. H. C.—H. T. GOODENOUGH :—and W. G. WATSON.**
- H. C.—A. COOKE.**

CLASS 54.—TURKEY, COCK. [7 entries.]

- I (£1 10s.)—V. G. HUNTLEY.**
- II (15s.)—W. JOHNSON.**
- III (10s.)—Mrs. J. TAYLOR.**
- V. H. C.—H. T. GOODENOUGH :—and W. F. SNELL.**
- H. C.—LADY DE ROTHSCHILD :—and G. L. FOSTER HABTER.**

CLASS 55.—TURKEY, HEN. [10 entries.]

- I (£1 10s.)—H. T. GOODENOUGH.**
- II (15s.)—W. JOHNSON.**
- III (10s.)—J. R. R. MITCHELL.**
- V. H. C.—J. F. HILL :—and TIPPING and PRESTON.**
- H. C.—LADY DE ROTHSCHILD :—and Mrs. J. TAYLOR.**

DEAD TABLE POULTRY.

(Forwarded alive, and killed and plucked by a Poulterer employed by the Society.)

CLASS 56.—PAIR OF COCKERELS OF 1898, OF ANY PURE BREED. 1st prize, £1 10s.; 2nd prize, 15s.; 3rd prize, 10s.

[No ENTRY.]

CLASS 57.—PAIR OF PULLETS OF 1898, OF ANY PURE BREED. [3 entries.]

- I (£1 10s.)—H. REEVES, *Dorkings*, Jan. 2nd.**
- C.—JAS. FRAYNE, *Indian Game*, Jan.**

CLASS 58.—PAIR OF COCKERELS OF 1898, OF A FIRST CROSS FROM ANY PURE BREEDS. [4 entries.]

- I (£1 10s.)—HIGHGATE MANOR POULTRY FARM, *Indian Game-Dorking*, Jan. 8th.**
- II (15s.)—LADY DE ROTHSCHILD, *Indian Game-Dorking*, Feb.**
- C.—LADY DE ROTHSCHILD, *Brahma-Dorkings*, Feb.**

CLASS 59.—PAIR OF PULLETS OF 1898, OF A FIRST CROSS
FROM ANY PURE BREEDS. [6 entries.]

I. (£1 10s.) and Special.*—H. HILL, *Indian Game-Dorking*, Jan. 14th.

II. (15s.)—LADY DE ROTHSCHILD, *Indian Game-Dorking*, Feb.

III. (10s.)—LADY DE ROTHSCHILD, *Brahma-Dorking*, Feb.

H. C.—HIGHGATE MANOR POULTRY FARM, *Indian Game-Dorking*,
n. 14th.

CLASS 60.—PAIR OF DUCKLINGS OF 1898. [5 entries.]

I. (£1 10s.)—W. POTTER, *Aylesbury*, March 12th.

II. (15s.)—F. READ, *Aylesbury*, March 20th.

V. H. C.—H. HILL, *Pekin-Aylesbury*, March 12th.

* Silver Cup, given by Sir Walter Gilbey, Bart., for the Best Pair of
cockerels, Pullets, or Ducklings in Class 56, 57, 58, 59, or 60.

BATH AND WEST AND SOUTHERN COUNTIES SOCIETY.
ART UNION HELD AT CARDIFF, MAY 30, 1898.

Prize Ticket.	Value of Prize.	Prize Winner.	Winner's Address.	Name of Picture.	Artist.	Price of Picture.
	£	s.				£ s. d.
1326	15	15	T. R. Hammond	10, Talbot Street, Cardiff ..	D. Bates ..	10 10 0
590	10	10	F. Cundall ..	{ 35, Dafforne Road, Upper Tooting }	G. Stainton ..	5 0 0
412	10	10	G. Stokes Selwyn	55, Argyll Street, Bedford ..	P. A. Hay ..	10 10 0
859	10	0	Dr. J. A. Voelcker	{ 20, Upper Phillimore Gar- dens, London, W. .. . }	H. S. Jackson ..	10 0 0
1183	10	0	T. H. Belcher ..	{ Borough Chambers, Wharton Street, Cardiff }	G. D. Hiscox ..	10 0 0
231	5	5	J. Evans ..	46, Tudor Street, Cardiff ..	Miss L. Cheviot ..	10 10 0
360	5	5	K. M. Browne ..	142, Fore Street, Exeter ..	A. Mortimer ..	5 5 0
1787	5	5	T. S. McKelvia ..	34, Talbot Street, Cardiff ..	J. E. Grace ..	5 5 0
1097	5	5	S. Dean ..	Westgate, Newport	P. Hagarty ..	5 5 0
1291	5	5	O. J. Reeves ..	Bratton, Wills	H. S. Tozer ..	5 5 0
1195	5	5	J. B. Pincock ..	{ 123, Kennington Avenue, Bishopston, Bristol .. }	W. M. Hodges ..	5 5 0
1488	5	0	W. Clarke ..	Ivy Cottage, Fulgrave, Diss ..	Miss M. Hastings ..	5 5 0
1782	5	0	W. P. Morgan ..	Chemist, Narberth	W. S. Morrish ..	5 0 0
426	5	0	G. Stokes Selwyn	55, Argyll Street, Bedford ..	C. E. Harris ..	3 0 0
					W. H. Mander ..	5 10 0
					W. H. Mander ..	5 10 0

677	4	1	Unclaimed ..	..	..	..	..	..	Stella ..	..	Miss A. Hunter ..	4	4	0
986	3	3	W. S. Aldis ..	..	..	..	..	..	8, Canal Terrace, Taunton ..	..	J. M. Stainforth ..	3	3	0
1448	3	3	J. T. Edwards ..	..	..	..	..	..	3, Richmond Crescent, Cardiff ..	..	E. W. Gregory ..	3	3	0
734	3	3	A. Mason ..	..	..	..	..	..	Swansea ..	..	H. S. Jackson ..	3	3	0
598	3	3	Captain Casberd ..	..	..	..	..	..	Swansea ..	..	H. S. Jackson ..	3	3	0
			..	..	..	..	..	..	Swansea ..	..	H. S. Jackson ..	3	3	0
736	3	3	W. Ball ..	..	..	..	..	..	Swansea ..	..	H. S. Jackson ..	3	3	0
1047	2	2	A. Mason ..	..	..	..	..	..	Swansea ..	..	H. S. Jackson ..	3	3	0
841	2	2	W. Clarke ..	..	..	..	..	..	Swansea ..	..	H. S. Jackson ..	3	3	0
990	2	2	H. D. Hitchcock ..	..	..	..	..	..	Swansea ..	..	H. S. Jackson ..	3	3	0
46	2	2	L. Pinn ..	..	..	..	..	..	Swansea ..	..	H. S. Jackson ..	3	3	0
59	2	2	L. Pinn ..	..	..	..	..	..	Swansea ..	..	H. S. Jackson ..	3	3	0
1542	2	2	J. H. Hall ..	..	..	..	..	..	Swansea ..	..	H. S. Jackson ..	3	3	0
1546	2	2	F. B. Seagar ..	..	..	..	..	..	Swansea ..	..	H. S. Jackson ..	3	3	0
<i>Unclaimed Prizes of Previous Year.</i>														
1083	10	10	Lady Lennard ..	..	Wickham Court, West Wick-	..	..	..	Silver Daylight ..	..	R. W. Vernon ..	10	0	0
438	5	5	E. Underwood ..	..	ham ..	..	..	..	Lowestoft Trawlers ..	..	R. W. Vernon ..	5	5	0
				{ Wickham Court, West Wick-										
				{ ham ..										
				{ 41, High Street, Bedford .. }										

By Order THOS. F. PLOWMAN,
4, Terrace Walk, Bath.

July 1st, 1808.

Bath and West and Southern Counties Society.

OBJECTS OF THE SOCIETY AND PRIVILEGES OF MEMBERSHIP.

ANNUAL EXHIBITIONS.

The Society annually holds an Exhibition in some city or town in England or Wales. Each section of the Society's district is visited at intervals, so that most Members have an opportunity of seeing the Show in their own neighbourhood every few years. Prizes to a large amount are given for Horses, Cattle, Sheep, Pigs, Farm Produce, &c. Provision is also made for the exhibition of Agricultural Implements and Machinery, Seeds, Cattle Foods, Artificial Manures, and articles of general utility. A substantially-built and completely-equipped Working-Dairy on a large scale is a special feature of these Exhibitions. Here explanatory demonstrations, and comparative tests of implements and processes are carried on with the assistance of well-known practical and scientific experts, and Butter-making Competitions are held. Among other features of the Annual Meeting are Shoeing and Milking Competitions, Poultry and Horticultural Shows, and Exhibitions illustrative of Bee-keeping, Home Industries, Art-Manufactures, and the Fine Arts.

Membership entitles to free admission to the Annual Exhibition, and also to the Grand Stand overlooking the Horse and Cattle Ring, to the Reserved Seats in the Working Dairy, and to the use of the Members' Special Pavilion for Reading, Writing, &c.

Entries can be made by Members (elected on or before the last Tuesday in January preceding the Show) at 10s. per entry for Horses (other than Harness), and 5s. per entry for Cattle, Sheep, and Pigs. Non-Members are required to pay £1 per entry for Horses (other than Harness) and 15s. per entry for the other Stock named. Similar reductions in the Fees in the Farm Produce, the Poultry, and other Classes are made to Members.

THE JOURNAL.

All Members receive free of charge the Society's Journal, which is published annually, bound in cloth. It has for its aim the dissemination of agricultural knowledge in a popular form, and in addition to original articles by well-known agricultural authorities, it contains particulars of the Society's general operations, full reports of its experimental and research work, prize awards, financial statements, lists of Members, reviews of new books on agriculture, &c. (The price of the Journal to non-Members is 6s. 4d. post free.)

CHEMICAL AND BOTANICAL FACILITIES.

The Society has a Consulting Chemist (Dr. J. A. Voelcker, M.A., F.I.C., &c.) and a Consulting Botanist (Mr. W. Carruthers, F.R.S.), from whom Members can obtain analyses and reports at reduced rates of charge.

EXPERIMENTS.

Experiments on Crops are conducted at experimental stations in various parts of the kingdom, and Members are enabled to take part in these and to receive reports thereon.

The Society has also an experimental station and laboratory attached to its

Cheese School, and a similar department for carrying on researches in connection with Cider-making. Here systematic investigations are conducted by a scientific staff, acting in conjunction with practical experts, *detailed reports of which are furnished to Members.*

TECHNICAL EDUCATION.

The Society conducts, on behalf of the Somerset County Council, a Cheese School, where Students are received and boarded, and also a Travelling Farriery School for promoting improvement in the Shoeing of Horses. *Members are admitted free to witness the Teaching and Competitions at any of the Society's Schools.*

FINE ART AND ART-MANUFACTURES.

One of the objects for which the Society was founded was the encouragement of Arts as well as Agriculture, and, to this end, exhibitions of Paintings and Art-Manufactures are annually held. The special aims of the Society in maintaining this department are:—1st. The encouragement of young Artists, especially, and of local efforts to bring art-workmanship to bear in the production of decorative or useful articles. 2nd. The exhibition of such art treasures as there may be in private or other collections, to which the public, ordinarily, have no access. No charge is made to Artists for the exhibitions of their Paintings, and, in order to promote the sale of meritorious works, an Art Union is held, the prizes for which are selected from the Pictures exhibited, a large sum being annually voted by the Society towards their purchase.

TERMS OF MEMBERSHIP.

ANNUAL SUBSCRIPTIONS.

Ordinary Members, not less than	£1
Tenant Farmers, the rateable value of whose holdings does not exceed £200 a-year, not less than	10/-

Governors, who are eligible for election as President or Vice-President, and who subscribe not less than £2, are entitled, in addition to the privileges already mentioned, to an extra Season Ticket for the Annual Exhibition and to the Grand Stand, &c. Governors subscribing more than £2 are entitled to a further Ticket for every additional £1 subscribed.

Members subscribing less than £1 are entitled to all the privileges of Membership except that of entering Stock at reduced fees, and their admission Ticket or the Annual Show is available for *one day only* instead of for the whole time of the Exhibition.

LIFE COMPOSITIONS.

Governors may compound for their Subscriptions for future years by payment, in advance, of £20; and Members by payment, in advance, of £10. Governors and Members who have subscribed for 20 years may become Life-Members on payment of half these amounts.

Any person desirous of joining the Society can be proposed by a Member, or by

THOS. F. PLOWMAN,
Secretary and Editor,

4, Terrace Walk, Bath.

Telegraphic Address :—"PLOWMAN, BATH."

Bath and West and Southern Counties Society.

GENERAL LAWS,

As revised in accordance with the Report of a Special Committee; which Report was received and adopted by the Annual General Meeting of Members, held on May 30, 1895.

COMPOSITION OF THE SOCIETY.

I. The Society shall consist of a President, Vice-Presidents, Trustees, Council, Treasurer, Secretary, and Members.

OBJECTS.

II. The Society shall have the following objects :—

- a. To hold Exhibitions of breeding stock, agricultural implements, and such other articles connected with agriculture, arts, manufactures or commerce as may be determined upon by the Council.
- b. To conduct practical and scientific investigations in agriculture.
- c. To promote technical education in agriculture by providing means of systematic instruction.
- d. To publish a Journal for circulation.

SUBSCRIPTIONS.

III. The Annual Subscriptions for Members shall be as follows :—

Governors (who are eligible for election as President or Vice-President) not less than	..	..	..	..	..	£2
Ordinary Members, not less than	..	..	..	..	..	£1
Tenant Farmers (the rateable value of whose holding does not exceed £200 a-year) not less than	..	..	..	..	..	10/-

IV. The payment of £20 in one sum shall constitute a Governor for life, and of £10 in one sum an Ordinary Member for life; but any Governor who has subscribed not less than £2 annually for a period of twenty years may become a life Governor on the further payment of £10 in one sum; and any Ordinary Member, who has subscribed not less than £1 annually for the same period, may become a Life-Member on the further payment of £5 in one sum.

V. Subscriptions shall become due and be payable in advance on the 1st of January in each year or as soon as the Subscriber has been elected a Member. When the election takes place during the last quarter of the year the subscription payable on election will be considered as applying to the ensuing year.

VI. A Member shall be liable to pay his subscription for the current year unless he shall have given notice, in writing, to the Secretary before January 1st of his intention to withdraw.

GOVERNING BODY.

VII. The entire management of the Society—including the making of By-laws, election of Members, determining the Prizes to be awarded, appointing Committees, fixing the Places of Meetings and Exhibitions, appointing or removing the Treasurer, Secretary, and such other officers as may be required to carry on

he business of the Society—shall be vested in the Council, who shall report its proceedings at the Annual Meetings of the Society.

VIII. The Council shall consist of the Patron (if any), President, Vice-Presidents, Trustees, and Treasurer (who shall be *ex-officio* Members), and of sixty-six elected Members.

ELECTION OF PRESIDENT, VICE-PRESIDENTS, TRUSTEES, AND COUNCIL.

IX. The election of a President for the year, of any additional Vice-President, of Trustees, and of the Members of Council representing the Divisions named in Law X., shall take place at the Annual Meeting of the Society, and they shall enter into office at the conclusion of the Exhibition during which such Annual Meeting has been held.

X. The sixty-six Members of the Council referred to in Laws VIII and IX. shall consist of fifty-eight persons residing or representing property in the following Divisions, viz. :—

Twelve from the Counties of Devon and Cornwall, which shall be called the Western Division ;

Twenty-four from the Counties of Somerset, Dorset, and Wilts, which shall be called the Central Division ;

Twelve from the Counties of Hants, Berks, Oxon, Bucks, Middlesex, Surrey, Sussex, and Kent, which shall be called the Southern Division ; and

Ten from the Counties of Worcester, Gloucester, Hereford and Monmouth, and the Principality of Wales, which shall be called the North-Western Division.

The remaining eight shall be elected (irrespective of locality) from the general body of Members, and shall form a Division which shall be called the "Without Reference to District" Division.

XI. One half of the elected Members in each of the five Divisions named in Law X. shall retire annually by rotation, but shall be eligible for re-election.

XII. The Council shall have power to nominate a President, Vice-Presidents, Trustees, and Members of Council for the approval of the annual meeting, and to fill up such vacancies in their own body as are left after the annual meeting, or as may from time to time occur during the interval between the annual meetings.

XIII. Nominations to offices, election to which is vested in the whole body of Members, must reach the Secretary ten days before the meeting at which such vacancies are to be filled up.

MEETINGS.

XIV. The Annual Meeting of the Society shall take place during the holding of the annual Exhibition.

XV. Special general meetings of the Society may be convened by the President on the written requisition of not less than three Members of Council ; and all Members shall have ten days' notice of the object for which they are called together.

XVI. No Member of less than three months' standing, or whose subscription is in arrear, shall be entitled to vote at a meeting.

EXHIBITIONS.

XVII. The annual Exhibitions of the Society shall be held in different Cities or Towns in successive years.

XVIII. All Exhibitors shall pay such fees as may be fixed by the Council. Members subscribing not less than £1 per annum, who have been elected previous to February 1st, and have paid the subscription for the current year, shall be entitled to exhibit at such reduction in these fees as the Council shall determine.

PRIZES.

XIX. All prizes offered at the cost of the Society shall be open for competition to the United Kingdom.

XX. No person intending to compete for any prize offered at the annual Exhibition shall be eligible to act as a judge or to have any voice in the selection of judges to award the premiums in the department in which he exhibits.

XXI. If it be proved to the satisfaction of the Council that any person has attempted to gain a prize in this, or in any other Society, by a false certificate or by a misrepresentation of any kind, such person shall thereupon be for the future excluded from exhibiting in this Society.

JOURNAL.

XXII. The Proceedings of the Society, Awards of Prizes, Financial Statements, and List of Officers, Governors and Members shall be printed annually in the Society's Journal, and every Governor and Member, not in arrear with his subscription, shall be entitled to receive one copy, free of expense, and there shall be an additional number printed for sale.

POLITICS.

XXIII. No subject or question of a political tendency shall be introduced at any meeting of this Society.

ALTERATIONS IN LAWS.

XXIV. No new General Law shall be made or existing one altered, added to or rescinded, except at an annual or special general meeting, and then only provided that a statement of particulars, in writing, shall have been sent to the Secretary at least twenty-one days previous to the meeting at which the question is to be considered.

List of Officers.

1898-99.

EXETER MEETING.

PATRON.

HIS ROYAL HIGHNESS THE PRINCE OF WALES, K.G.

PRESIDENT FOR 1898-99.

E RIGHT HON. THE LORD CLINTON, Heanton Satchville, Dolton, N. I

TRUSTEES.

PAGET, THE RIGHT HON. SIR RICHARD HORNER, Bart., Cranmore
Shepton Mallet.

LENNARD, SIR JOHN FARNABY, Bart., Wickham Court, West Wickham,

*CLINTON, THE RIGHT HON. THE LORD, Heanton Satchville, I
N, Devon.

VICE-PRESIDENTS.

YORK, H.R.H. THE DUKE OF, K.G.	York House, London, S.W.
ACLAND, SIR C. T. D., Bart.	Holnicote, Taunton
*AMHERST, EARL	Montreal, Sevenoaks, Kent
BATH, MARQUESS OF.	Longleat, Warminster
BELFIELD, JOHN	Primley Hill, Torquay
BEST, CAPT. J. C., R.N.	Vivod, Llangollen
BRYMER, W. E., M.P.	Ilslington House, Dorchester
*CLARENDON, EARL OF	The Grove, Watford
*CORK AND ORRERY, EARL OF	Marston, Frome
*COVENTRY, EARL OF	Croome Court, Severn Stoke
DAW, R. R. M.	Spurbarne, Exeter
DEVONSHIRE, DUKE OF, K.G.	Chatsworth, Derbyshire
DIGBY, G. D. W.	Sherborne Castle, Sherborne
*DUCIE, EARL OF	Tortworth, Falfield, R.S.O.
*FORTESCUE, EARL	Castle Hill, South Molton
GIBBS, A.	Tyntesfield, Bristol
GORING, REV. J.	Wiston Park, Steyning
HULSE, SIR E., Bart.	Breamore, Salisbury
*ILCHESTER, EARL OF	Melbury, Dorchester
*JERSEY, EARL OF	Middleton Park, Bicester, Ox
JONES, H. P.	Beaufort House, Winchester
*LANDSOWNE, MARQUESS OF, K.G.	Bowood, Calne
LECONFIELD, LORD	Petworth House, Sussex
LENNARD, SIR J. F., Bart.	Wickham Court, West Wic
*LLEWELYN, SIR J. T. D., Bart., M.P.	Penllergare, Swansea
*LOPES, THE RIGHT HON. SIR M., Bart.	Maristow, Roborough, S. Dev
LOYD, LEWIS	Monk's Orchard, Bromley, Ke
MILDMAY, SIR H. ST. JOHN, Bart.	Dogmersfield Park, Winchiel
*MONTAGU OF BEAULIEU, LORD	Palace House, Beaulieu, Han
MOORE-STEVENS, J. C.	Winscott, Great Torrington

*. * Those to whose names an asterisk (*) is prefixed have filled the office of President

VICE-PRESIDENTS—*continued.*

MORETON, LORD.	Sarsden House, Chipping Norton
*MORLEY, EARL OF	Saltram, Plympton, Devon
MORRELL, G. HERBERT, M.P.	Headington Hill Hall, Oxford
*MOUNT-EDGECUMBE, EARL OF	Mount Edgcombe, Devonport
NEVILLE-GRENVILLE, R.	Butleigh Court, Glastonbury
NORTHUMBERLAND, DUKE OF	Albury Park, Guildford
*ONSLOW, EARL OF	7, Whitehall Place, London, S.W.
PAGET, THE RIGHT HON. SIR R. H., Bart.	Cranmore Hall, Shepton Mallet
PINNEY, W.	Somerton
POLTIMORE, LORD	Poltimore, Exeter
*PORTMAN, VISCOUNT	Bryanston, Blandford
PORTAL, MELVILLE	Laverstock House, Micheldever, Hants
SAINT GERMAN, EARL OF	Port Elliot, Devonport
SKRINE, H. D.	Claverton Manor, Bath.
SOMERSET, DUKE OF	Maiden Bradley, Bath
STORY-MASKELYNE, N.	Bassett Down House, Swindon
STUCLEY, SIR G. S., Bart.	Moreton, Bideford, N. Devon
*TEMPLE, EARL	Newton Park, Bath.
THYNNE, LORD HENRY	Muntham, Worthing
*TREDGAR, LORD	Tredgar Park, Newport, Monmouth
*TREMAYNE, JOHN	Heligan, St. Austell
WALROND, SIR W. H., Bart., M.P.	Bradfield, Cullompton
*WARWICK, EARL OF	Warwick Castle
WINCHESTER, MARQUESS OF	Amport St. Mary's, Andover
*WINDSOR, LORD.	Hewell Grange, Bromsgrove
THE LORD WARDEN OF THE STANNARIES.	
THE SURVEYOR-GENERAL OF THE DUCHY OF CORNWALL.	
THE RECEIVER-GENERAL OF THE DUCHY OF CORNWALL.	

*. * Those to whose names an asterisk (*) is prefixed have filled the office of President.

MEMBERS OF COUNCIL.

EX-OFFICIO MEMBERS.

THE PATRON.	THE TREASURER.
THE PRESIDENT.	THE CONSULTING SURVEYOR.
THE VICE-PRESIDENTS.	

ELECTED MEMBERS.

WESTERN DIVISION (DEVON AND CORNWALL).

(12 Representatives.)

<i>Elected in 1897:—</i>		<i>Elected in 1898:—</i>	
<i>Name.</i>	<i>Address.</i>	<i>Name.</i>	<i>Address.</i>
THO, T. B., M.P.	Treridden, Penzance	COLLINS, C. R.	Hartwell House, Exeter
AND, F. W.	Bampfylde House, Exeter	MARKER, R.	Combe, Honiton
IR, SIR D. DUCK-		SHELLEY, SIR J., Bt.	Shobrooke Park, Crediton
ORTH, Bart.	Wear House, Exeter	WILLIAMS, SIR W. R.,	
ERS, E. J.	Stoke House, Exeter	Bart.	Heanton, Barnstaple
IFANT, A. O.	Coombe, Copplestone	WIPPKILL, R.	Thorverton, Devon.
ER, W. P.	Merafield, Plympton	WYATT-EDGEELL, COL. A.	Cowley Place, Exeter

CENTRAL DIVISION (SOMERSET, DORSET, AND WILTS).

(24 Representatives.)

WN, W. J.	Middlehill House, Box, Wilt	ALLEN, J. D.	Springfield House, Shepton Mallet
BY, J. K. W.,		BEST, COL. G.	Charlton House, Ludwell, Salisbury
.P.	Sherborne Castle, Sherborne	FOXCROFT, E. T. D.	Hinton Charterhouse, Bath
E, T.	Long Ashton Lodge, Clifton	GIBSON, J. T.	Harvet Lodge, Langford, R.S.O., Somerset
ARDS, C. L. F.	The Court, Axbridge, Somerset	HOBHOUSE, H., M.P.	Hadspen House, Castle Cary
WELL, F. G.	11, Laura Place, Bath	LLEWELLYN, E. H.,	Langford Court, Langford, Somerset
LER, W. H.	Claremont, Taunton	M.P.	
ONS, G.	Tunley Farm, near Bath	MAULE, M. ST. J.	Chapel House, Bath
L, J. F.	Sharcombe, Wells, Somerset	NAPIER, H. B.	Chippenham
TENSBURY, LORD	Heytesbury, Wilt	NEELD, SIR A. W.,	Barrow, Chippenham
D, SIR A. AC-		SHEESTON, MAJOR C. D.	Evercreech, Bath
ND, Bart., M.P.	St. Audries, Bridgwater	SKRINE, COL. H. M.	Warleigh Manor, Bath
NER, A. C.	Pound, Bishop's Lydeard, Somerset	WILLIAMS, E. W.	Herrington, Dorchester
CHEY, E., M.P.	Pensford, Somerset		

SOUTHERN DIVISION (HANTS, BERKS, OXON, BUCKS, MIDDLESEX, SURREY, SUSSEX, AND KENT).

(12 Representatives.)

ROFT, W.	13, The Waldrons, Croydon	DRUCK, A. F. M.	Bladon, Woodstock
LER, CAPT. W. J. C.	The Elms, Taplow	KNOLLYS, C. R.	Grange Cottage, Alresford, Hants
HALL, H. M., F.S.A.	Richmond, Surrey	RUTHERFORD, J. A.	Highclere Castle, Newbury
, C.	Grosvenor House, Stockbridge, Hants	STANFORD, A.	Eastons, Steyning
OUR, R. A. H.	46, Earl Street, Maidstone	WHITEHEAD, C. F. L. S.	Barming House, Maidstone
ON, M. J.	Henley Park, Oxon	WILLIAMS, A. G.	Portsea, Hants

EAST-WESTERN DIVISION (WORCESTERSHIRE, GLOUCESTERSHIRE, HEREFORDSHIRE, MONMOUTHSHIRE, AND WALES).

(10 Representatives.)

ER, G. E. LLOYD	Hardwicke Court, Gloucester	ARKWRIGHT, J. H.	Hampton Court, Leominster
, A.	Worcester	MARTIN, G. E.	Hani Court, Upton-on-Severn
OR, H. W.	Showle Court, Ledbury	MASON, A.	North Hill, Swansea
ER, A. P.	The Leen, Pembridge, Hereford	PHILLIPS, C. D.	Newport, Mon.
		STRATTON, R.	The Duffryn, Newport, Mon.

WITHOUT REFERENCE TO DISTRICT DIVISION.

(8 Representatives.)

H. M.	Higham, Kent	BEST, CAPT. T. G.	Abbott's Ann, Andover, Hants
R, COL. W. D.	84, Cornwall Gardens, London, S.W.	GORING, C.	Wiston Park, Steyning
ND, HOWARD P.	Moxhull Park, Erdington, Warwick	LATHAM, T.	Dorchester, Oxon
		RANSOME, J. E.	Orwell Works, Ipswich

STANDING COMMITTEES, 1898-99.[The PRESIDENT is *ex-officio* Member of all Committees.]**AGRICULTURAL EDUCATION.**PAGET, RIGHT HON. SIR R. H., Bart., *Chairman.*

ACLAND, SIR C. T. D., Bart.	BOLITHO, T. B. (M.P.)	KNOLLYS, C. R.
ALLEN, J. D.	EDWARDS, C. L. F.	LATHAM, T.
BAKER, G. E. LLOYD	GIBBONS, G.	LENNARD, SIR J. F., Bart.
BEST, COL. G.	GORING, REV. J.	MASKELYNE, N. STORY-
	HOBHOUSE, H. (M.P.)	SUTTON, M. J.

(With power to add to their number.)

ALLOTMENT.BEST, CAPT. J. C., *Chairman.*

BEST, COL. G.	EDWARDS, C. L. F.	NAPIER, H. B.
BOTELE, CAPT. W. J. C.	GIBBONS, G.	SILLIFANT, A. O.

ARTS.WYATT-EDGELL, COL. A., *Vice-Chairman.*

ACLAND, SIR C. T. D., Bart.	DAW, R. R. M.	MORRELL, G. H. (M.P.)
BATH, MARQUESS OF	FARWELL, F. G.	NAPER, COL. W. D.
CUNDALL, H. M. (F.S.A.)	HALL, J. F.	WILLIAMS, E. W.
	MOORE-STEVENS, J. C.	

(With power to add to their number.)

CONTRACTS.LLEWELLYN, E. H. (M.P.), *Chairman.*

BEST, CAPT. J. C.	EDWARDS, C. L. F.	NAPIER, H. B.
BOTELE, CAPT. W. J. C.	MASON, A.	NEVILLE-GRENVILLE, R.

DAIRY.ACLAND, SIR C. T. D., Bart., *Chairman.*

ALLEN, J. D.	KNOLLYS, C. R.	NAPIER, H. B.
ASHCROFT, W.	LATHAM, T.	NEVILLE-GRENVILLE, R.
EDWARDS, C. L. F.	LENNARD, SIR J. F., Bart.	PAGET, RT. HON. SIR R. H., Bart.
FOWLER, W. H.	LLEWELLYN, E. H. (M.P.)	WIPPELL, R.
GIBBONS, G.	MASKELYNE, N. STORY-	
HALL, J. F.		

DISQUALIFYING.

THE STEWARDS OF HORSES.	THE STEWARDS OF STOCK.
THE STEWARD OF POULTRY.	

EXPERIMENTS.ACLAND, SIR C. T. D., Bart., *Chairman.*

ALLEN, J. D.	GIBSON, J. T.	NEVILLE-GRENVILLE, R.
ASHCROFT, W.	HEYTESBURY, LORD	PAGET, RT. HON. SIR R. H., Bart.
DYKE, T.	KNOLLYS, C. R.	RUTHERFORD, J. A.
DRUCE, A. F. M.	LENNARD, SIR J. F., Bart.	SUTTON, M. J.
FARWELL, F. G.	LLEWELLYN, E. H. (M.P.)	
GIBBONS, G.	MASKELYNE, N. STORY-	

(With power to add to their number.)

FINANCE.

	COLLINS, C. R., <i>Chairman.</i>	
DYKE, T.	|	MARTIN, G. E.

IMPLEMENT REGULATIONS.

	SHELLEY, SIR J., <i>Chairman.</i>	
), SIR C. T. D., Bart.	EDWARDS, C. L. F.	NAPIER, H. B.
CAPT. J. C.	GIBBONS, G.	NEVILLE-GRENVILLE, R.
ER, CAPT. W. J. C.	HEYTESBURY, LORD	RANSOME, J. E.
T.	MASON, A.	

JOURNAL.

	ACLAND, SIR C. T. D., Bart., <i>Chairman.</i>	
D, F. W.	| FARWELL, F. G.	| MARTIN, G. E.
	MASKELYNE, N. STORY-	

JUDGES' SELECTION.

	LENNARD, SIR J. F., Bart., <i>Chairman.</i>	
, J. D.	GIBBONS, G.	SHELLEY, SIR J., Bart.
COL. G.	HALL, J. F.	SILLIFANT, A. O.
, W. J.	MOORE-STEVENS, J. C.	WILLIAMS, E. W.
A. F. M.		

RAILWAY ARRANGEMENTS AND ADVERTISEMENTS.

	BEST, CAPT. J. C., <i>Chairman.</i>	
ST, EARL	DRUCE, A. F. M.	MASON, A.
EARL OF	LENNARD, SIR J. F., Bart.	PHILLIPS, C. D.
FRY, EARL OF	LOPES, SIR M., Bart.	SHELLEY, SIR J., Bart.

(With power to add to their number.)

SELECTION.

THE CHAIRMEN OF ALL OTHER COMMITTEES.

SHOW DATES.

CHAIRMEN OF THE ALLOTMENT, DAIRY, FINANCE, IMPLEMENT REGULATIONS, RAILWAY ARRANGEMENTS, AND STOCK PRIZE-SHEET COMMITTEES, and THE TOWARD OF WORKS.

(With power to add two to their number.)

STOCK PRIZE-SHEET.

	LENNARD, SIR J. F., Bart., <i>Chairman.</i>	
, J. D.	GIBBONS, G.	SHELLEY, SIR J., Bart.
MARQUESS OF	HEYTESBURY, LORD	SILLIFANT, A. O.
COL. G.	LLEWELLYN, E. H. (M.P.)	STANFORD, A.
, W. J.	MOORE-STEVENS, J. C.	VOSPER, W. P.
, A. F. M.	SANDERS, E. J.	WILLIAMS, E. W.
ELL, F. G.		

Stewards.

<i>Arts.</i>		<i>Farriery School.</i>	
CUNDALL, H. M. (F.S.A.)		BEST, COL. G.	
FARWELL, F. G.		<i>Finance.</i>	
<i>Butter and Milk Tests.</i>		COLLINS, C. R. MARTIN, G. E.	
LLEWELLYN, E. H. (M.P.)		DYKE, T.	
<i>Cattle, Sheep and Pigs.</i>		<i>Horses.</i>	
LENNARD, SIR J. F., Bart.		WILLIAMS, E. W. BEST, COL. G.	
DRUCE, A. F. M.		<i>Horticulture.</i>	
SILLIFANT, A. O.		FOWLER, W. H.	
<i>Cider.</i>		<i>Music.</i>	
FARWELL, F. G.		CUNDALL, H. M. (F.S.A.)	
<i>Dairy.</i>		<i>Poultry.</i>	
GIBBONS, G. KNOLLYS, C. R.		SANDERS, E. J.	
<i>Assistant Dairy Steward (Milking).</i>		<i>Shoeing.</i>	
LATHAM, T.		LATHAM, T.	
<i>Dairy Schools.</i>		<i>Works.</i>	
GIBBONS, G.		NAPIER, H. B.	
<i>Experiments.</i>		<i>Yard.</i>	
KNOLLYS, C. R. ASHCROFT, W.		BEST, CAPT. J. C.	
DRUCE, A. F. M.		EDWARDS, C. L. F.	
		BOTELE, CAPT. W. J. C.	
		<i>Assistant Yard Steward.</i>	
		MASON, A.	

Other Honorary Officials.

<i>Treasurer</i> —BADCOCK, H. J.	|	<i>Local Treasurer</i> —DYMOND, F. W.
<i>Consulting Surveyor</i> —SPACKMAN, H.		

Permanent Staff.

<i>Secretary</i> —PIOWMAN, THOMAS F.		<i>Consulting Botanist.</i>
<i>Editor of 'Journal.'</i>	<i>Associate Editor.</i>	CARRUTHERS, W. (F.R.S.)
PIOWMAN, THOS. F. LLOYD, F. J. (F.I.C.)		<i>Veterinary Inspector.</i>
<i>Auditor.</i>		BROWN, SIR G. T. (C.B.)
GOODMAN, A. (<i>Chartered Accountant</i>)		<i>Superintendent of Works.</i>
<i>Consulting Chemist.</i>		ROSSITER, J.
VOELCKER, DR. J. A. (M.A., F.I.C.)		

Year.	Place Visited.	Local Subscrip- tion.	Prizes.			Total Local Contri- bution.	President.	Admissions.		
			Local Com- mittee.	Local Society.	Local Resi- dents.			On 2s. 6d. days.	On 1s. Days.	Total.
1852	Taunton	£ 210	£ ..	£ ..	£ ..	£ 210	Lord Portman.	..	..	..
1853	Plymouth	450	..	..	..	450	Sir T. D. Acland, Bart.	..	..	..
1854	Bath	450	..	..	..	450	William Miles, M.P.	..	..	..
1855	Tiverton	450	..	..	..	450	Earl Fortescue	..	..	..
1856	Yeovil	450	..	..	..	450	C. A. Moody, M.P.	..	..	..
1857	Newton Abbot	700	..	..	..	700	Lord Courtenay	..	..	..
1858	Cardiff	800	..	..	..	800	Lord Courtenay	..	..	..
1859	Barnstaple	800	85	..	1	966	John Sillifant.	..	..	..
1860	Dorchester	900	..	..	..	900	Lord Rivers	10,709	11,949	22,658
1861	Truro	900	..	..	..	900	J. W. Buller, M.P.	15,201	14,230	29,421
1862	Wells	900	..	..	..	900	Sir T. D. Acland, Bart.	10,578	4,775	15,353
1863	Exeter	900	..	..	..	900	Marquis of Bath	15,635	19,284	34,919
1864	Bristol	1000	106	..	50	1156	Earl Fortescue	22,377	65,678	88,055
1865	Hereford	900	358	..	..	1258	Lord Taunton.	16,575	35,261	51,836
1866	Salisbury	900	57	..	..	957	Earl of Portsmouth	7,288	18,737	26,025
1867	Salisbury	..	..	..	..	..	J. Tremayne	7,502	16,702	24,204
1868	Falmouth	900	..	..	..	900	Sir J. T. B. Duckworth, Bart.	11,393	19,495	30,888
1869	Southampton	900	132	..	18	1050	Earl of Carnarvon	15,340	41,290	56,630
1870	Taunton	900	..	..	..	900	Sir S. H. Northcote, Bart., C.B., M.P.	17,952	33,653	51,605
1871	Guildford	900	110	..	..	1010	Earl of Cork	10,656	23,406	34,062
1872	Dorchester	800	..	..	10	810	Duke of Marlborough, K.G.	12,791	21,517	34,308
1873	Plymouth	800	..	400	..	1200	Earl of Mount-Edgcumbe	16,665	45,744	62,409
1874	Bristol	800	403	..	..	1203	Sir Massey Lopes, Bart., M.P.	37,329	72,791	110,120

ANNUAL EXHIBITIONS—continued.

Year.	Place Visited.	Local Subscription.	Prizes.			Total Local Contribution.	President.	Admission.		
			Local Committee.	Local Societies.	Local Residents.			On 2d. day.	On 12. Days.	Total.
		£	£	£	£	£				
1875	Croydon.	800	245	..	..	1045	R. Benyon, M.P.	14,518	26,028	40,546
1876	Hereford	800	381	..	..	1181	Earl of Ducie	16,396	32,645	49,041
1877	Bath	800	215	..	..	1015	Marquis of Lansdowne	27,625	48,852	76,477
1878	Oxford	800	..	170	6	976	Earl of Jersey.	12,414	26,995	39,409
1879	Exeter	800	..	..	10	810	Earl of Morley	14,634	40,533	55,167
1880	Worcester	800	..	254	..	1054	Earl of Coventry	8,415	37,675	46,090
1881	Tunbridge Wells	800	245	34	..	1079	Marquess of Abergavenny	13,368	33,236	46,604
1882	Cardiff	800	200	198	17	1215	Lord Tredegar	23,941	38,680	62,621
1883	Bridgwater	800	78	..	..	878	Lord Brooke, M.P.	17,171	31,241	48,412
1884	Maidstone	800	310	33	75	1218	Viscount Holmesdale.	13,501	31,053	44,554
1885	Brighton	800	227	33	82	1142	Viscount Hampden	9,637	39,851	49,488
1886	Bristol	800	525	..	..	1325	Lord Carlingford	29,580	70,999	100,579
1887	Dorchester	800	..	112	..	912	Earl of Ilchester	8,860	29,846	38,706
1888	Newport (Mon.)	800	100	..	..	900	Lord Tredegar	14,878	38,567	53,445
1889	Exeter	800	..	..	10	810	Lord Clinton	16,405	36,195	52,600
1890	Rochester	800	294	..	26	1120	Earl of Daruley	3,480	48,314	51,794
1891	Bath	800	50	103	100	1053	Earl Temple	22,510	52,185	75,695
1892	Swansea	800	200	100	10	1110	Sir J. T. D. Llewellyn, Bart.	18,364	54,609	72,973
1893	Gloucester	800	400	..	..	1200	Lord Fitzhardinge	14,272	40,368	54,640
1894	Guildford	800	174	..	10	984	Earl of Onslow	8,671	29,813	38,484
1895	Taunton	800	85	160	10	1055	Viscount Portman	13,181	30,111	43,292
1896	St. Albans	800	162	..	..	962	Earl of Clarendon	12,056	22,380	34,436
1897	Southampton	800	50	..	..	850	Lord Montagu of Beaulieu	8,284	33,750	42,034
1898	Cardiff	800	200	..	..	1000	Lord Windsor.	13,101	42,501	55,602
1899	Exeter	800	..	..	..	..	Lord Clinton	..	..	..

Members' Privileges.

EXAMINATION OF PLANTS AND SEEDS.

Members of the Bath and West and Southern Counties Society, who may also be Members of other Agricultural Societies, are particularly requested, in applying for Examination of Plants and Seeds, to state that they do so as Members of the first-named Society.

THE Council have arranged for the following rates of charge for the examination, by the Society's Consulting Botanist, of Plants and Seeds for the *bonâ fide* and individual information and benefit of Members of the Society (not being seedsmen). The charge for examination must be paid at the time of application, and the carriage of all parcels must be prepaid.

No.		
1.	—A report on the purity and germinating power of a sample of seed, stating the sorts and amount of any other seeds found therein	1s.
2.	—Determination of the species of any weed or other plant, or of any epiphyte or vegetable parasite, with a report on its habits, and the means for its extermination or prevention	1s.
3.	—Report on any disease affecting farm crops	1s.
4.	—Determination of the species of a collection of natural grasses found in any district, with a report on their habits and pasture value	5s.

N.B.—The Consulting Botanist's Reports on Seeds are furnished to enable Members,—purchasers of seeds and corn for Agricultural or Horticultural purposes,—to test the value of what they buy, and not to be used or made available for advertising or trade purposes.

PURCHASE OF SEEDS.

The purchaser should obtain from the vendor, by invoice or otherwise, a proper designation of the seed he buys, with a guarantee that it contains not more than a specified amount of other seeds, and is free from ergot, or, in the case of clovers, from dodder, and of the percentage of seeds that will germinate.

The germination of cereals, green crops, clover, and timothy grass should be not less than 90 per cent.; of fox-tail not less than 60 per cent.; of other grasses not less than 70 per cent.

The Council strongly recommend that the purchase of prepared mixtures should be avoided, and that the different seeds to be sown should be purchased separately.

INSTRUCTIONS FOR SELECTING AND SENDING SAMPLES.

I. SEEDS.

In sending seed or corn for examination the utmost care must be taken to secure a fair and honest sample. In the case of grass-seeds the sample should be drawn from the centre of the sack or bag, and in all cases from the bulk delivered to the purchaser and not from the purchase sample. When bought by sample, the whole or part of that sample should also be sent.

When it is considered necessary to secure legal evidence, the sample should be taken from the bulk and placed in a sealed bag in the presence of a reliable witness who is acquainted with the identity of the bulk, and care should be taken that the purchased sample and bulk be not tampered with after delivery, or mixed or come in contact with any other sample or stock.

One ounce of grass and other small seeds should be sent, and two ounces of cereals or larger seeds. The exact name under which the seed has been bought should be sent with it.

Grass-seeds should be sent at least FOUR WEEKS, and clover-seeds TWO WEEKS before they are required, and they should not be sown until the report has been received.

II. PLANTS.

In collecting specimens of plants, the whole plant should be taken up, and the earth shaken from the roots. If possible, the plants must be in flower or fruit. They should be packed in a light box, or in a firm paper parcel.

Specimens of diseased plants or of parasites should be forwarded as fresh as possible. They should be placed in a bottle, or packed in tin-foil or oil-silk.

All specimens should be accompanied with a letter specifying the nature of the information required, and stating any local circumstances (soil, situation, &c.) which, in the opinion of the sender, would be likely to throw light on the inquiry.

Parcels or letters containing seeds or plants for examination (carriage or postage prepaid) must be addressed to Mr. W. CARETHERS, F.R.S., 43, Central Hill, Norwood, London, S.E.

Members' Privileges.

ANALYSES OF FERTILISERS, FEEDING-STUFFS, WATERS, SOILS, &c.

Applicable only to the case of Persons who are not commercially engaged in the manufacture or sale of any substance sent for Analysis.)

Members of the Bath and West and Southern Counties Society, who may also be Members of other Agricultural Societies, are particularly requested, in applying for Analyses, to state that they do so as Members of the first-named Society.

The Council have fixed the following rates of Charges for Chemical Analyses to Members of the Society.

These privileges are applicable only when the Analyses are for *bond-fide* agricultural purposes, and are required by Members of the Society for their own use and guidance in respect of farms or land in their own occupation and within the United Kingdom.

The analyses are given on the understanding that they are required for the individual and sole benefit of the Member applying for them, and must not be used for other persons, or for commercial purposes.

Land or estate agents, bailiffs, and others, when forwarding samples, are required to state the names of those Members on whose behalf they apply.

Members are also allowed to send for analysis under these privileges any manures or feeding-stuffs to be used by their outgoing tenants, or which are to be given free of cost to their occupying tenants.

The analyses and reports may not be communicated to either vendor or manufacturer, except in cases of dispute.

Members are requested, when applying for an analysis, to quote the number in the subjoined schedule under which they wish it to be made.

No.		
1.	An opinion of the purity of bone-dust or oil-cake (each sample)	2s. 6d.
2.	An analysis of sulphate or muriate of ammonia, or of nitrate of soda, together with an opinion as to whether it be worth the price charged	5s.
3.	An analysis of guano; showing the proportion of moisture, organic matter, sand, phosphate of lime, alkaline salts and ammonia, together with an opinion as to whether it be worth the price charged	10s.
4.	An analysis of mineral superphosphate of lime for soluble phosphates only, together with an opinion as to whether it be worth the price charged	5s.
5.	An analysis of superphosphate of lime, dissolved bones, &c., showing the proportions of moisture, organic matter, sand, soluble and insoluble phosphates, sulphate of lime, and ammonia, together with an opinion as to whether it be worth the price charged	10s.
6.	An analysis of bone-dust, basic slag, or any other ordinary artificial manure, together with an opinion as to whether it be worth the price charged	10s.
7.	An analysis of compound artificial manures, animal products, refuse substances used for manure, &c.	from 10s. to £1
8.	An analysis of limestone, showing the proportion of lime	7s. 6d.
9.	An analysis of limestone, showing the proportion of lime and magnesia	10s.
10.	An analysis of limestone or marl, showing the proportion of carbonate, phosphate, and sulphate of lime and magnesia, with sand and clay	10s.
11.	Partial analysis of a soil, including determinations of clay, sand, organic matter, and carbonate of lime	10s.
12.	Complete analysis of a soil	£3
13.	An analysis of oil-cake or other substance used for feeding purposes, showing the proportion of moisture, oil, mineral matter, albuminous matter, and woody fibre, as well as of starch, gum, and sugar in the aggregate; and an opinion of its feeding and fattening or milk-producing properties	10s.
14.	Analysis of any vegetable product	10s.
15.	Determination of the "hardness" of a sample of water before and after boiling	5s.
16.	Analysis of water of land-drainage, and of water used for irrigation	£1
17.	Analysis of water used for domestic purposes	£1 10s.
18.	An analysis of milk (to assist Members in the management of their Dairies and Herds, <i>bond fide</i> for their own information and not for trade purposes, nor for use in connection with the Sale of Food and Drugs Acts)	5s.
19.	Personal consultation with the Consulting Chemist. (To prevent disappointment it is suggested that Members desiring to hold a consultation with the Consulting Chemist should write to make an appointment)	5s.
20.	Consultation by letter	5s.
21.	Consultation necessitating the writing of three or more letters	10s.

Members wishing to exercise their privileges on the above-named terms, should forward their samples for examination, *by post or parcel, prepaid*, to the Consulting Chemist, Dr. JOHN AUGUSTUS VOELCKER, M.A., F.I.C., 22, Tudor Street, New Bridge Street, London, E.C.

The fees for analysis must be sent to the Consulting Chemist at the time of application.

GUIDE TO PURCHASERS OF FERTILISERS AND FEEDING-STUFFS.

UNDER the provisions of the Fertilisers and Feeding Stuffs Act of 1893, District Agricultural Analysts have been appointed throughout the country to examine samples taken in compliance with the Act. Inasmuch, however, as the procedure necessitated in these cases is very complicated, Members of the Bath and West and Southern Counties Society will find it much simpler to avail themselves of the privileges afforded by the Society, and will be able to protect themselves both amply and with far less trouble, by making their purchases in accordance with the following directions, and by stipulating that purchases shall be subject to the analysis and report of the Society's Consulting Chemist.

Purchasers are recommended in every case to insist upon having an Invoice given to them. This invoice should set out clearly:—

In the case of **Fertilisers**—

- (1.) the **name** of the fertiliser;
- (2.) whether the fertiliser be artificially **compounded** or not;
- (3.) the minimum **analysis** guaranteed in respect of the principal fertilising ingredients.

In the case of **Feeding-Stuffs**—

- (1.) the **name** of the article;
- (2.) the **description** of the article: whether it has been made from one substance or seed only, or from more than one.

(NOTE.—The use of the terms "Linseed-cake," "Cotton-cake," &c., implies that these cakes shall be "pure," and purchasers are recommended to insist upon these terms being used without any qualification such as "95 per cent.," "as imported," &c. "Oil-cake" should be avoided. Mixed feeding-cakes and meals should be only purchased with guaranteed analysis.)

Members of the Society should see that the **Invoices** agree accurately with the orders given by them, and, in giving these orders, they should stipulate that the goods come up to the guarantees set out in the following list, and that they be sold subject to the **analysis and report of the Consulting Chemist of the Bath and West and Southern Counties Society**.

FERTILISERS.

Raw Bones, Bone-meal, or Bone-dust to be guaranteed "**PURE**," and to contain not less than 45 per cent. of Phosphate of Lime, and not less than 4 per cent. Ammonia.

Boiled or Steamed Bones to be guaranteed "**PURE**," and to contain not less than 55 per cent. of Phosphate of Lime, and not less than 1 per cent. of Ammonia.

Mineral Superphosphate of Lime to be guaranteed to contain a certain percentage of "**Soluble Phosphate**." [From 25 to 28 per cent. of Soluble Phosphate is an ordinarily good quality.]

Dissolved Bones to be guaranteed to be "**made from raw bone and acid only**" and to be sold as containing stated minimum percentages of Soluble Phosphate, Insoluble Phosphates, and Ammonia.

Compound Artificial Manures, Bone Manures, Bone Compounds, &c., to be sold by analysis stating the minimum percentages of Soluble Phosphate, Insoluble Phosphates, and Ammonia contained.

Basic Slag to be guaranteed to contain a certain percentage of Phosphoric Acid [a good quality contains 17 per cent. or more of Phosphoric Acid], and to be sufficiently finely ground that 80 to 90 per cent. passes through a sieve having 10,000 meshes to the square inch.

Peruvian Guano to be described by that name, and to be sold by analysis stating the minimum percentages of Phosphates and Ammonia.

Sulphate of Ammonia to be guaranteed to be "PURE," and to contain not less than 24 per cent. of Ammonia.

Nitrate of Soda to be guaranteed to contain 95 per cent. of pure Nitrate of Soda.

Kainit to be guaranteed to contain 23 per cent. of Sulphate of Potash.

All Fertilisers to be delivered in good and suitable condition for sowing.

FEEDING-STUFFS.

Linseed Cake, Cotton Cake (Decorticated and Undecorticated), and **Rape Cake** (for feeding purposes) to be pure, i.e. prepared *only* from the one kind of seed from which their name is derived. The report of the Consulting Chemist of the Bath and West and Southern Counties Society to be conclusive as to the "purity" or otherwise of any feeding-stuffs.

Mixed Feeding Cakes, Meals, &c., to be sold on a guaranteed analysis.

INSTRUCTIONS FOR SELECTING AND SENDING SAMPLES FOR ANALYSIS.

GENERAL RULES.

1.—A sample taken for analysis should be fairly *representative of the bulk* from which it has been drawn.

2.—The sample should reach the Analyst *in the same condition as it was at the time when drawn*.

FERTILISERS.

When **Fertilisers** are delivered in bags, select four or five of these from the bulk, and either turn them out on a floor and rapidly mix their contents, or else drive a shovel into each bag and draw out from as near the centre as possible a couple of shovelfuls of the manure, and mix these quickly on a floor.

Halve the heap obtained in either of these ways, take one-half (rejecting the other) and mix again rapidly, flattening down with the shovel any lumps that appear. Repeat this operation until at last only some three or four pounds are left.

From this fill three tins, holding from $\frac{1}{2}$ -lb. to 1-lb. each, mark, fasten up and seal each of these. Send one for analysis, and retain the others for reference.

Or,—the manure may be put into glass bottles provided with well-fitting corks; the bottles should be labelled and the corks sealed down. The sample sent for analysis can be packed in a wooden box and sent by post or rail.

When manures are delivered in bulk, portions should be *successively drawn from different parts* of the bulk, the heap being turned over now and again. The portions drawn should be thoroughly mixed, sub-divided, and, finally, samples should be taken as before, except that when the manure is coarse and bulky it is advisable to send larger samples than when it is in a finely-divided condition.

FEEDING-STUFFS.

Linseed, Cotton, and other Feeding Cakes.—If a single cake be taken, three strips should be broken off right across the cake and from the middle portion of it, one piece to be sent for analysis, and the other two retained for reference. Each of the three pieces should be marked, wrapped in paper, fastened up and sealed. The piece forwarded for analysis can be sent by post or rail.

A more satisfactory plan is to select four to six cakes from different parts of the delivery, then break off a piece about four inches wide from the middle of

each cake, and pass these pieces through a cake-breaker. The broken cake should then be well mixed, and three samples of about 1 lb. each should be taken and put in tins or bags duly marked, fastened, and sealed as before. One of these lots should be sent for analysis, the remaining two being kept for reference. It is advisable, also, with the broken pieces to send a small strip from an unbroken cake.

Feeding Meals, Grain, &c.—Handfuls should be drawn from the centre of half-a-dozen different bags of the delivery; these lots should then be well mixed, and three $\frac{1}{2}$ -lb. tins or bags filled from the heap, each being marked, fastened up, and sealed. One sample is to be forwarded for analysis and the others retained for reference.

SOILS, WATERS, &c.

Soils.—Have a wooden box made 6 inches in length and width, and from 9 to 12 inches deep, according to the depth of soil and subsoil of the field. Mark out in the field a space of about 12 inches square; dig round in a slanting direction a trench, so as to leave undisturbed a block of soil and its subsoil 9 to 12 inches deep; trim this block to make it fit into the wooden box, invert the open box over it, press down firmly, then pass a spade under the box and lift it up, gently turn over the box, nail on the lid, and send by rail. The soil will then be received in the position in which it is found in the field.

In the case of very light, sandy, and porous soils, the wooden box may be at once inverted over the soil and forced down by pressure, and then dug out.

Waters.—Samples of water are best sent in glass-stoppered Winchester bottles, holding half-a-gallon. One such bottle is sufficient for a single sample. Care should be taken to have these scrupulously clean. In taking a sample of water for analysis it is advisable to reject the first portion drawn or pumped, so as to obtain a sample of the water when in ordinary flow. The bottle should be rinsed out with the water that is to be analysed, and it should be filled nearly to the top. The stopper should be secured with string, or be tied over with linen or soft leather. The sample can then be sent carefully packed either in a wooden box with sawdust, &c., or in a hamper with straw.

Milk.—A pint bottle should be sent in a wooden box.

GENERAL INSTRUCTIONS.

Time for Taking Samples.—All samples, both of fertilisers and feeding-stuffs, should be taken as soon after their delivery as possible, and should reach the Analyst within *ten days* after delivery of the article. In every case it is advisable that the Analyst's certificate be received before a fertiliser is sown or a feeding-stuff is given to stock.

Procedure in the Event of the Vendor wishing Fresh Samples to be Drawn.—Should a purchaser find that the Analyst's certificate shows a fertiliser or feeding-stuff not to come up to the guarantee given him, he may inform the vendor of the result and complain accordingly. He should then send to the vendor *one* of the two samples which he has kept for reference. If, however, the vendor should demand that a fresh sample be drawn, the purchaser must allow this, and also give the vendor an opportunity of being present, either in person or through a representative whom he may appoint. In that case, three samples should be taken in the presence of both parties with the same precautions as before described, *each* of which should be duly packed up, labelled, and *sealed* by both parties. One of these is to be given to the vendor, one is to be sent to the Analyst, and the third is to be kept by the purchaser for reference or future analysis if necessary.

All samples intended for the Consulting Chemist of the Society should be addressed (postage or carriage prepaid) to Dr. J. AUGUSTUS CHEKE, A. F.I.C., 22, Tudor Street, New Bridge Street, London, E.C. 3. Instruction should be sent at the same time.

EXETER MEETING,

MAY 24, 25, 26, 27, AND 29, 1899.

MONEY PRIZES.

	£	s.	d.	PAGE
HORSES	765	0	0	lxxxv
CATTLE	1,263	10	0	lxxxix
SHEEP	515	5	0	xcii
PIGS	205	0	0	xciv
CHEESE	106	0	0	xcvi
BUTTER AND CREAM	59	10	0	xcvi
BUTTER-MAKING	40	0	0	xcvii
MILKING	11	5	0	xcviii
SHOEING	22	0	0	xcviii
POULTRY	169	10	0	cviii
Total	£3,157	0	0	

DONORS OF MONEY PRIZES.

	£	s.	d.
Bath and West and Southern Counties Society	2,818	5	0
Devon County Agricultural Association	150	0	0
Exeter Horse Show Society	75	0	0
English Jersey Cattle Society	31	0	0
A Member of the English Jersey Cattle Society	30	0	0
Kerry and Dexter Cattle Society	10	10	0
Captain J. C. Best, R.N. (Poultry)	10	0	0
Shorthorn Society	20	0	0
Mr. R. Dunsford	5	5	0
British Berkshire Society	5	0	0
English Guernsey Cattle Society	2	0	0
	£3,157	0	0

DONORS OF MEDALS AND PLATE.

In addition to the Money Prizes, there are offered :—

- A GOLD MEDAL, in the Shire Horse Classes, by the Shire Horse Society.
- A GOLD and 2 SILVER MEDALS, in the Hunter Classes, by the Hunters' Improvement Society.
- A CHALLENGE SILVER BOWL, in the Jersey Classes, by Sir James Blyth, Bart.
- A CHALLENGE CUP, value 25 Guineas, in the Jersey Classes, by the Duke of Marlborough.
- A GOLD, a SILVER, and a BRONZE MEDAL, in the Butter Test Classes, by the English Jersey Cattle Society.
- A SILVER CUP, and a SILVER, and a BRONZE MEDAL, in the Guernsey Butter Test Class, by the English Guernsey Cattle Society.
- A GOLD MEDAL, and 16 SILVER, and 16 BRONZE MEDALS, in the Cider Classes, by the Society.
- A GOLD, a SILVER, and a BRONZE MEDAL, in the Butter-Making Classes, by the Society.

PRIZES.

HORSES.		First Prize.	Second Prize.	Third Prize.
		£	£	£
<i>An Animal can be entered in as many Classes as it is eligible for on payment of an additional fee in each Class. No additional fee is, however, payable in the case of special prizes for exhibits already entered in any particular Class.</i>				
SHIRE.				
(Eligible for the Shire Horse Society's Stud Book.)				
CLASS				
1.—STALLION, foaled before 1897	20	10	5	
2.—STALLION, foaled in 1897	20	10	5	
3.—COLT, foaled in 1898	15	10	5	
4.—MARE and FOAL, or in-FOAL	20	10	5	
5.—FILLY or GELDING, foaled in 1896	10	5	3	
6.—FILLY or GELDING, foaled in 1897	10	5	3	
7.—FILLY or GELDING, foaled in 1898	10	5	3	
Offered by the Shire Horse Society, a Gold Medal, value £10, for Best MARE or FILLY in Class 4, 5, 6, or 7, under Conditions 46, stated on page ciii.				
ANY AGRICULTURAL BREED EXCEPT SHIRE.				
8.—MARE and FOAL, or in-FOAL	15	10	5	
9.—FILLY or GELDING, foaled in 1896	10	5	3	
10.—FILLY or GELDING, foaled in 1897	10	5	3	
SPECIAL PRIZES.				
<i>* Best Exhibit in Class 9, the bonâ fide property of a resident in Devonshire, and that has been such for at least two months immediately prior to the 1st day of May, 1899 .</i>		2		
<i>* Best Exhibit in Class 10, ditto</i>		2		
HUNTERS.				
11.—MARE and FOAL, or in-FOAL	20	10	5	
12.—MARE or GELDING, foaled in 1895	20	10	5	
13.—FILLY or GELDING, foaled in 1896	15	10	5	
14.—FILLY or GELDING, foaled in 1897	10	7	3	
15.—FILLY, COLT, or GELDING, foaled in 1898	10	7	3	

The Prizes printed in *italics* are offered by the Exeter Horse Show Society.

HORSES— <i>continued.</i>			
	First Prize.	Second Prize.	Third Prize.
	£	£	£
SPECIAL PRIZES.			
(Offered by the Hunters' Improvement Society.)			
A Gold Medal, or £5 and a Bronze Medal, for the Best HUNTER BROOD MARE in Class 11, in-Foal to, or with Foal at-foot by, a Thoroughbred Horse or Registered Hunter Sire, under Conditions 47, stated on page ciii.			
A Silver Medal, for the Best HUNTER FILLY in Class 13, 14, or 15, not exceeding three years' old (foaled in 1896, 1897, or 1898), under Conditions 48, stated on page civ.			
A Silver Medal, for the Best HUNTER of either Sex and of any Age, got by a Premium Stallion (including the Silver Medal Sires at the Hunter Spring Shows) or by a Registered Hunter Sire out of a Registered Mare, and not having previously won a corresponding Medal during 1899, under Conditions 49, stated on page civ.			
SPECIAL PRIZES.			
* <i>Best Exhibit in Class 11, the bonâ fide property of a resident in Devonshire, and that has been such for at least two months immediately prior to the 1st day of May, 1899 .</i>	5		
* <i>Best Exhibit in Class 12, ditto</i>	5		
* <i>Best Exhibit in Class 13, ditto</i>	3		
* <i>Best Exhibit in Class 14, ditto</i>	3		
* <i>Best Exhibit in Class 15, ditto</i>	3		
CLASS			
*16.—Mare or Gelding, calculated to carry 13 stone and upwards	8	5	
<i>Exhibits in Class 16 must be the bonâ fide property of Tenant Farmers occupying not less than 50 acres of land in Devonshire, and following the occupation of farming for a living, and must have been in their possession for at least two months immediately prior to the 1st day of May, 1899. No previous winner of the 1st Prize in this Class at the Exeter Horse Show can compete.</i>			
*17.—Mare or Gelding, that has been regularly hunted during the past season with any recognised pack of hounds in Devonshire, to be ridden by the owner or his son, or a bonâ fide subscriber to such pack. (A certificate from the Master of Hounds must be produced)	5	3	

* The Prizes printed in *italics* are offered by the Exeter Horse Show Society.

HORSES— <i>continued.</i>		First Prize.	Second Prize.	Third Prize.
CLASS		£	£	£
HACKNEYS.				
18.—	MARE and FOAL, or in-FOAL	15	10	5
19.—	MARE or GELDING, foaled before 1895	10	5	3
20.—	MARE or GELDING, foaled in 1895 or 1896	10	5	3
21.—	FILLY or GELDING, foaled in 1897	10	5	3
22.—	FILLY, COLT, or GELDING, foaled in 1898	10	5	3
23.—	Mare or Gelding, calculated to carry 15 stone at least, not over 15 hands high and not less than 4 years old, the bona fide property of a resident in Devonshire, and that has been such for at least two months immediately prior to the 1st day of May, 1899	8	5	
PONIES.				
24.—	MARE or GELDING, 4 years old or over, exceeding 13 and not exceeding 14 hands	10	5	3
25.—	MARE or GELDING, 4 years old or over, not exceeding 13 hands	10	5	3
SPECIAL PRIZES.				
	* Best Exhibit in Class 24, the bona fide property of a resident in Devonshire, and that has been such for at least two months immediately prior to the 1st day of May, 1899	3		
	* Best Exhibit in Class 25, ditto	3		
HARNESS.				
Horses entered in the Hackney or Pony Classes can, if eligible, be also entered, on payment of an additional fee, in the Harness Classes.				
Horses entered in the Double Harness and Tandem Classes can also be entered, on payment of an additional fee, in the Single Harness Classes.				
Horses entered in the Harness Classes only must be in the Show Yard by 2 p.m. on the day on which they compete, and, with the consent of the Stewards, may leave the Yard as soon as the Class has been judged.				
26.—	PAIR of CARRIAGE HORSES (Mares or Geldings), 15 hands or over, to be driven in double harness on the 2nd day of Show	15	5	2
27.—	MARE or GELDING, 15 hands or over, to be driven in single harness on the 2nd day of Show	8	4	2
28.—	TANDEM (Mares or Geldings), 15 hands or over, to be driven in harness on the 2nd day of Show	15	5	2
29.—	MARE or GELDING, over 14 and under 15 hands, to be driven in harness on the 3rd day of Show	8	4	2
30.—	PAIR of HORSES (Mares or Geldings), under 15 hands, to be driven in double harness on the 3rd day of Show	15	5	2

* The Prizes printed in *italics* are offered by the Exeter Horse Show Society

HORSES— <i>continued.</i>		First Prize.	Second Prize.	Third Prize.	Fourth Prize.
CLASS					
31.—TANDEMS (Mares or Geldings), under 15 hands, to be driven in harness on the 3rd day of Show		£ 15	£ 5	£ 2	£
*32.— <i>Horse (over 15 hands) and Vehicle, bonâ fide the property of a tradesman or firm carrying on business within the Parliamentary Borough of Exeter, which have been regularly used for the purpose of his business for at least three months immediately prior to the 1st day of May, 1899. The general turn out will be taken into consideration. To be exhibited on the 4th day of Show</i>		5	3		
33.—MARE or GELDING, over 13 and not over 14 hands, to be driven in harness on the 4th day of Show		10	5	2	
34.—MARE or GELDING, not over 13 hands, to be driven in harness on the 5th day of Show		8	4	2	
*35.— <i>Horse (not over 15 hands) and Vehicle, bonâ fide the property of a tradesman or firm carrying on business within the Parliamentary Borough of Exeter, which have been regularly used for the purpose of his business for at least three months immediately prior to the 1st day of May, 1899. The general turn out will be taken into consideration. To be exhibited on the 5th day of Show</i>		3	1		
In Classes 36 and 37 there is no entry fee, the Prizes being intended for the men in charge of the horses.					
36.—MARE or GELDING, the property of and worked by the Corporation of Exeter. To be exhibited in harness on the 5th day of Show		1	10s.	7s. 6d.	5s.
37.—MARE or GELDING, which has been worked in the Exeter Show Yard, the property of a Railway Company running into Exeter. To be exhibited in harness on the 5th day of Show		1	10s.	7s. 6d.	5s.
2s. 6d. will be given for each Exhibit commended in Classes 36 and 37.					

* The Prizes printed in *italics* are offered by the Exeter Horse Show Society.

CATTLE.		First Prize.	Second Prize.	Third Prize.
		£	£	£
DEVON.				
<p>the Classes for South Devon Cattle and South Devon, Dartmoor, and Exmoor Sheep, £150 of the amount offered in Prizes is contributed by the Devon County Agricultural Association.</p>				
BULL, calved in 1895 or 1896	15	10	5	
BULL, calved in 1897	15	10	5	
BULL, calved in 1898	10	5	2	
Cow, in-Milk or in-Calf, calved before 1896	15	10	5	
HEIFER, in-Milk or in-Calf, calved in 1896	10	5	2	
HEIFER, calved in 1897	10	5	2	
HEIFER, calved in 1898	7	5	2	
SOUTH DEVON.				
BULL, calved in 1895 or 1896	15	10	5	
BULL, calved in 1897	15	10	5	
BULL, calved in 1898	10	5	2	
Cow, in-Milk or in-Calf, calved before 1896	15	10	5	
HEIFER, in-Milk or in-Calf, calved in 1896	10	5	2	
HEIFER, calved in 1897	10	5	2	
HEIFER, calved in 1898	7	5	2	
SHORT-HORN.				
BULL, calved in 1895 or 1896	15	10	5	
BULL, calved in 1897	15	10	5	
BULL, calved in 1898	10	5	2	
Cow, in-Milk or in-Calf, calved before 1896	15	10	5	
<p>nimal entered in Class 55 can, if eligible, be also ed, on payment of an additional fee, in Class 56.)</p>				
<p>ne First Prize in Class 56 is offered by the Short-Horn Society.</p>				
<p>ure Short-Horn Cow, in-Milk, of any age, eligible for and entered in, Coate's Herd Book (or pedigree sent for such entry before the Show), that has not previously won a First Prize offered by the Short-Horn Society in a corresponding Class</p>				
HEIFER, in-Milk or in-Calf, calved in 1896	10	5		
HEIFER, calved in 1897	10	5	2	
HEIFER, calved in 1898	7	5	2	
CHAMPION PRIZE.				
(Offered by the Short-Horn Society.)				
Best Bull in Class 52, 53 or 54, entered in or eligible for Coate's Herd Book	10			

CLASS	CATTLE— <i>continued.</i>	First Prize.	Second Prize.	Third Prize.
		£	£	£
	HEREFORD.			
60.	BULL, calved in 1895 or 1896	15	10	5
61.	BULL, calved in 1897	15	10	5
62.	BULL, calved in 1898	10	5	2
63.	Cow, in-Milk or in-Calf, calved before 1896	15	10	5
64.	HEIFER, in-Milk or in-Calf, calved in 1896	10	5	2
65.	HEIFER, calved in 1897	10	5	2
66.	HEIFER, calved in 1898	7	5	2
	SUSSEX.			
67.	BULL, calved in 1895 or 1896	15	10	5
68.	BULL, calved in 1897 or 1898	15	10	5
69.	Cow or HEIFER, in-Milk or in-Calf, calved in or before 1896	15	10	5
70.	HEIFER, calved in 1897	10	5	2
71.	HEIFER, calved in 1898	7	5	2
	JERSEY.			
72.	BULL, calved in 1895 or 1896	15	10	5
73.	BULL, calved in 1897	15	10	5
74.	BULL, calved in 1898	10	5	2
75.	Cow, in-Milk or in-Calf, calved before 1896	15	10	5
76.	HEIFER, in-Milk or in-Calf, calved in 1896	10	5	2
77.	HEIFER, calved in 1897	10	5	2
78.	HEIFER, calved in 1898	7	5	2
	SPECIAL PRIZES.			
	(Offered by Sir James Blyth, Bart.)			
	The Blythwood Challenge Silver Bowl, weighing 25 ounces, for the Best Cow or Heifer in-Milk, in any of the Jersey Classes, bred in Great Britain or Ireland, to be awarded by inspection (see Special Conditions 59 on page cv.).			
	(Offered by His Grace the Duke of Marlborough.)			
	A Challenge Cup, value 25 guineas, for the Best Bull, not exceeding 18 months old, Cow of any age in-Milk or in-Calf, and Heifer her produce in-Milk or in-Calf, in any of the Jersey Classes, the property of one Exhibitor (see Special Conditions 60 on page cv.).			
	GUERNSEY.			
79.	BULL, calved in 1895 or 1896	15	10	5
80.	BULL, calved in 1897	15	10	5
81.	BULL, calved in 1898	10	5	2
82.	Cow, in-Milk or in-Calf, calved before 1896	15	10	5
83.	HEIFER, in-Milk or in-Calf, calved in 1896	10	5	2
84.	HEIFER, calved in 1897	10	5	2
85.	HEIFER, calved in 1898	7	5	2

CATTLE— <i>continued.</i>		First Prize.	Second Prize.	Third Prize.
LASS				
KERRY.		£ s.	£	£
86.—BULL, calved in 1896, 1897, or 1898		7	5	2
87.—COW or HEIFER, in-Milk or in-Calf, calved in or before 1896		7	5	2
88.—HEIFER, calved in 1897 or 1898		7	5	2
SPECIAL PRIZE.				
(Offered by the Kerry and Dexter Cattle Society.)				
Best Animal in Class 86, 87, or 88		5	5	
DEXTER KERRY.				
89.—BULL, calved in 1896, 1897, or 1898		7	5	2
90.—COW or HEIFER, in-Milk or in-Calf, calved in or before 1896		7	5	2
91.—HEIFER, calved in 1897 or 1898		7	5	2
SPECIAL PRIZE.				
(Offered by the Kerry and Dexter Cattle Society.)				
Best Animal in Class 89, 90, or 91		5	5	
DAIRY.				
<i>Animals entered in the Breed Classes can, if eligible, be entered also, on payment of an additional fee, in the Classes 92 to 96 inclusive.</i>				
92.—Cow, in-Milk, of any breed or cross, under 900 lbs. live weight, yielding the largest quantity of Milk, containing, at each of the two competitive milkings, 12·25 per cent. of total solids, of which not less than 3·25 per cent. shall be fat		10	3	2
93.—Cow, in-Milk, of any breed or cross, 900 lbs. live weight or over ditto ditto		10	3	2
BUTTER TEST.				
The Prizes in Classes 94 and 95 are offered by the English Jersey Cattle Society, and Entries in them are subject to any conditions issued by that Society previous to the Tests.				
94.—Cow, of any breed or cross, under 900 lbs. live weight, obtaining the greatest number of points by the practical Test of the Separator and Churn, judged by the scale of points adopted by the English Jersey Cattle Society		10	3	2
95.—Cow of any breed or cross, 900 lbs. live weight and over ditto ditto		10	3	2

CATTLE— <i>continued.</i>			
	First Prize.	Second Prize.	Third Prize.
Gold, Silver, and Bronze Medals are offered for the three Jersey Cows, entered or eligible for entry in the English Jersey Herd Book, obtaining the greatest number of points in the Test.	£ s.	£	£
SPECIAL PRIZES.			
(Offered by the English Jersey Cattle Society.)			
£1 for the best quality of Butter produced by any Jersey Cow awarded a Medal, Prize, or Certificate of Merit in Class 94 or 95.			
(By a Member of the English Jersey Cattle Society.)			
£30 for the Cow of any Age or Breed yielding the greatest weight of Butter in the Butter Test Classes at any two of the following Shows in 1899:—Bath and West Society's Show at Exeter; Tring Agricultural Society's Show; and the London Dairy Show.			
(The Prizes in Class 96 are offered by the English Guernsey Cattle Society.)			
CLASS			
96. Cow or Heifer, entered in the English Guernsey Cattle Society's Herd Book, or eligible for entry therein, obtaining the greatest number of points by the practical Test of the Churn, the points to be reckoned on the weight of Butter and an allowance for lactation to be made under the scale settled by the English Guernsey Society.			
1st Prize, Silver Cup, value £5.			
2nd „ Silver Medal and 20s.	1		
3rd „ Bronze Medal and 20s.	1		
S H E E P.			
COTSWOLD.			
97.—Shearling RAM	10	5	2
98.—Pair of RAM LAMBS, dropped in 1899	10	5	2
99.—Pen of three Shearling EWES	10	5	2
DEVON LONG-WOOLLED.			
100.—Shearling RAM	10	5	2
101.—Pair of RAM LAMBS, dropped in 1899	10	5	2
102.—Pen of three Shearling EWES	10	5	2
103.—Pen of three Ewes, the property of an Exhibitor who has never shown out of Devon	5	5	
(The Prize in Class 103 is offered by Mr. R. Dunsford, Pinhoe, Exeter.)			

SHEEP— <i>continued</i> .		First Prize.	Second Prize.	Third Prize.
SOUTH DEVON.		£	£	£
earling RAM		10	5	2
ir of RAM LAMBS, dropped in 1899		10	5	2
n of three Shearling EWES		10	5	2
SOUTHDOWN.				
earling RAM		10	5	2
ir of RAM LAMBS, dropped in 1899		10	5	2
n of three Shearling EWES		10	5	2
HAMPSHIRE DOWN.				
earling RAM		10	5	2
ir of RAM LAMBS, dropped in 1899		10	5	2
n of three Shearling EWES		10	5	2
SHROPSHIRE.				
earling RAM		10	5	2
ir of RAM LAMBS, dropped in 1899		10	5	2
n of three Shearling EWES		10	5	2
OXFORD DOWN.				
earling RAM		10	5	2
ir of RAM LAMBS, dropped in 1899		10	5	2
n of three Shearling EWES		10	5	2
ERSET AND DORSET HORNED.				
earling RAM		10	5	2
ir of RAM LAMBS, dropped after Nov. 1st, 1898		10	5	2
n of three Shearling EWES		10	5	2
EXMOOR.				
<i>(To be shown in their Wool.)</i>				
earling RAM		10	5	2
ir of RAM LAMBS, dropped in 1899		10	5	2
n of three Shearling EWES		10	5	2
DARTMOOR.				
<i>(To be shown in their Wool.)</i>				
earling RAM		10	5	2
ir of RAM LAMBS, dropped in 1899		10	5	2
n of three Shearling EWES		10	5	2

P I G S.		First Prize.	Second Prize.	Third Prize.
CLASS		£	£	£
BERKSHIRE.				
128.—BOAR, farrowed in 1896, 1897, or 1898		7	3	2
129.—Pair of BOARS, farrowed in 1899		5	2	1
130.—Breeding Sow, farrowed before 1899		7	3	2
131.—Pair of Breeding Sows, farrowed in 1899		5	2	1
SPECIAL PRIZE.				
(Offered by the British Berkshire Society.)				
<i>Best Pig in the Berkshire Classes entered in, or eligible for, the Herd Book</i>				
		5		
LARGE WHITE.				
132.—BOAR, farrowed in 1896, 1897, or 1898		7	3	2
133.—Pair of BOARS, farrowed in 1899		5	2	1
134.—Breeding Sow, farrowed before 1899		7	3	2
135.—Pair of Breeding Sows, farrowed in 1899		5	2	1
MIDDLE WHITE.				
136.—BOAR, farrowed in 1896, 1897, or 1898		7	3	2
137.—Pair of BOARS, farrowed in 1899		5	2	1
138.—Breeding Sow, farrowed before 1899		7	3	2
139.—Pair of Breeding Sows, farrowed in 1899		5	2	1
SMALL WHITE or SMALL BLACK.				
140.—BOAR, farrowed in 1896, 1897, or 1898		7	3	2
141.—Pair of BOARS, farrowed in 1899		5	2	1
142.—Breeding Sow, farrowed before 1899		7	3	2
143.—Pair of Breeding Sows, farrowed in 1899		5	2	1
TAMWORTH.				
144.—BOAR, farrowed in 1896, 1897, or 1898		7	3	2
145.—Pair of BOARS, farrowed in 1899		5	2	1
146.—Breeding Sow, farrowed before 1899		7	3	2
147.—Pair of Breeding Sows, farrowed in 1899		5	2	1

Prizes for Cider for 1899.

PRODUCE.

CIDER.

(Open to Growers or Makers.)

First Prize in each Class, a Silver Medal and a Certificate.
Second Prize in each Class, a Bronze Medal and a Certificate.

CHAMPION PRIZE.

For Best Exhibit in any of the Classes, a Gold Medal and a Certificate.

The Cider must have been made in 1898, and each Exhibit in Cask must consist of not less than 18 gallons.

CLASS

Cider made in Devon.

- 148.—Cask of CIDER, containing not less than 4 per cent. of alcohol.
- 149.—12 Bottles of CIDER, ditto
- 150.—Cask of CIDER, containing less than 4 per cent. of alcohol.
- 151.—12 Bottles of CIDER, ditto

Cider made in Herefordshire.

- 152.—Cask of CIDER, containing not less than 4 per cent. of alcohol.
- 153.—12 Bottles of CIDER, ditto
- 154.—Cask of CIDER, containing less than 4 per cent. of alcohol.
- 155.—12 Bottles of CIDER, ditto

Cider made in Somerset.

- 156.—Cask of CIDER, containing not less than 4 per cent. of alcohol.
- 157.—12 Bottles of CIDER, ditto
- 158.—Cask of CIDER, containing less than 4 per cent. of alcohol.
- 159.—12 Bottles of CIDER, ditto

**Cider made in Counties other than Devon, Hereford,
or Somerset.**

- 160.—Cask of CIDER, containing not less than 4 per cent. of alcohol.
- 161.—12 Bottles of CIDER, ditto
- 162.—Cask of CIDER, containing less than 4 per cent. of alcohol.
- 163.—12 Bottles of CIDER, ditto

	First Prize.	Second Prize.	Third Prize.	Fourth Prize.
	£	£	£	£
CHEESE.				
CLASS				
164.—Three CHEESES (not less than 56 lbs. each), made in 1898	15	10	5	3
165.—Three Cheddar CHEESES (not less than 28 lbs. each), made in 1898 by a Student who has received not less than a week's instruction in one of the Society's Cheese Schools . .	8	5	3	2
166.—Three CHEESES (not less than 28 lbs. each), made in 1899	8	5	3	2
167.—Three Cheddar CHEESES (not less than 28 lbs. each), made in 1899 by a Student who has received not less than a week's instruction in one of the Society's Cheese Schools . .	6	4	2	1
168.—Eight Loaf or other Truckle CHEESES, made in 1899	5	3	2	1
169.—Three Caerphilly CHEESES, made in 1899	3	2	1	10s.
170.—Three Cream or other Soft CHEESES .	3	2	1	10s.

BUTTER AND CREAM.

(These Classes are not open to Professional Teachers.)

171.—3 lbs. of Fresh (or very slightly salted) BUTTER, made of Cream from Cows other than Channel Island Breeds .	4	3	2	1
172.—3 lbs. of Fresh (or very slightly salted) BUTTER, made of Cream from Cows of Channel Island Breeds only . .	4	3	2	1
173.—3 lbs. of Fresh (or very slightly salted) BUTTER, made from scalded Cream .	4	3	2	1
174.—3 lbs. of BUTTER, to which no salt whatever has been added	4	3	2	1

BUTTER AND CREAM—continued.		First Prize.	Second Prize.	Third Prize.	Fourth Prize.
CLASS	SPECIAL PRIZES.	£	£	£	£
	Three Prizes of £1 each will be given for BUTTER, which has the best keeping qualities, exhibited in Class 171, 172, 173, or 174. 1 lb. will be taken on the first day of the Show from each Prize lot of Butter in the Classes named, and will be judged on the last day of the Show.	1 1 1			
175.—	12 lbs. of Salted BUTTER, in a jar or crock, to be delivered to the Secretary four weeks before the Show .	4	3	2	1
176.—	4 half-pounds of Clotted or Devonshire CREAM	3	2	1	10s.

BUTTER-MAKING.

Professional Teachers, Makers or Vendors of Churns, or persons in any way representing the interests of Makers or Vendors of Churns, are not eligible to compete in the Butter-Making Classes. This Regulation will be strictly enforced.

A previous winner of the Society's Champion Gold Medal is not eligible to compete in any of the Butter-Making Classes.

These Prizes will be awarded for the best and largest quantity of Butter made from a given quantity of Cream in the cleanest and most approved method.

177.—	On the 1st day of the Show, open to any Dairymaid (not residing with or employed by her parents) working for wages not exceeding £20 a year .	4	3	2	1
178.—	On the 2nd day of the Show, open to any man or woman who has never won a First Prize in any open Butter-making competition	4	3	2	1
179.—	On the 3rd day of the Show, open to any woman	4	3	2	1
180.—	On the 4th day of the Show, open to any man or woman except the winner of the 1st Prize in Class 179	4	3	2	1

BUTTER-MAKING—continued.

CHAMPION PRIZES.
 On the 5th day of the Show the Winners of Prizes in Classes 177, 178, 179, and 180 will compete for:—
 1st Prize—A Gold Medal, and the Society's Certificate.
 2nd Prize—A Silver Medal, and the Society's Certificate.
 3rd Prize—A Bronze Medal, and the Society's Certificate.

MILKING.**CLASS**

	First Prize.	Second Prize.	Third Prize.	Fourth Prize.
	£ s.	£ s.	£ s.	£ s.
181.—For Men 20 years of age and over .	1 10	1 0	0 15	0 10
182.—For Women 20 years of age and over .	1 10	1 0	0 15	0 10
183.—For Boys and Girls under 20 years of age	1 10	1 0	0 15	0 10

SHOEING.

184.—Best Shoeing of a NAG HORSE by a Smith on the 3rd day of the Show .	5 0	3 0	2 0	1 0
185.—Best Shoeing of a CART HORSE by a Smith on the 4th day of the Show .	5 0	3 0	2 0	1 0

The Registration Committee of the Farriers' Company will admit the Winners of First Prizes in these Competitions to the Official Register *free of charge*, on their satisfying the Judges that they have a fair knowledge of the structure of the horse's foot, and on the necessary application being made to the Company in the prescribed form.

BUTTER-MAKING, SHOEING, & SHEARING.

The Devon County Agricultural Association will offer Prizes, provided by a grant in aid made by the Technical Education Committee of the Devon County Council, for Butter-Making, Sheep-Shearing and Horse-Shoeing by Students who have attended the various Classes of instruction promoted by the Devon County Council. Particulars of these Competitions can be obtained from, and entries must be made to, the Secretary of the Devon County Agricultural Association, Mr. John L. Winter, Totnes.

CONDITIONS AND REGULATIONS.

GENERAL.

ENTRIES.

1. The following are the Fees payable for Entries made on or before April 4. After that date and up to April 10, Entries (except in the Harness Classes) will only be received on payment, in each case, of double the Fee named below. *Exhibitors are requested to note that no exception can be made to this.* The Entry-fee is not returnable to an Exhibitor who enters an Animal in a Class for which it is ineligible.

		Members. Non-Members.	
		(see Reg. 5 below)	
Horses other than Harness Horses (see Reg. 2 below), including Horse Box	for each Entry	10s.	20s.
Cattle, Sheep, and Pigs	do.	5s.	15s.
Butter and Milk Test (Classes 92, 93, 94, 95, and 96)	do.	10s. 6d.	21s.
Cheese, Class 164	do.	10s.	20s.
Do. Classes 166, 168, 169, and 170	do.	5s.	10s.
Do. Classes 165 and 167	do.	5s.	5s.
Cider, Butter, and Cream	do.	} 2s. 6d.	5s.
Butter-making, Classes 178 to 180 ..	do.		
Butter-making, Class 177	do.	1s.	1s.
Horse-Shoeing	do.	2s. 6d.	5s.
Milking	do.	2s. 6d.	2s. 6d.

2. Horses entered in the Harness Classes must be in the Yard by 2 P.M. on the day on which they compete, and, with the consent of the Stewards, may leave the Yard as soon as they have been judged. Entries of Harness Horses, if no Horse Box is required, must reach the Secretary not later than May 3. If a Box is required the Entry must reach the Secretary on or before April 4, or, at double fees, by April 10. The Entry Fees are—

		Members. Non-Members.	
Without Horse Box	for each Entry	5s.	10s.
With Horse Box	do.	10s.	20s.

3. No Exhibitor can make more than three Entries in any one Class of Horses, Cattle, Sheep, or Pigs.

4. No Entry will be received unless the Fee accompanies it, and (if the Exhibitor is a Member of the Society) the subscription for the year, unless previously paid, together with any arrears that may be due.

5. The privilege of entering at Members' Fees is strictly limited to Members of the Society, or of the Devon County Agricultural Association, elected on or before January 31, 1899, and subscribing not less than 1*l.* annually.

6. Where a Prize is offered for a *pair* or *pen* of Animals, Single Entry-fees only are payable for each *pair* or *pen*, and only one Entry-form must be used.

7. All Entries must be made on the printed forms to be obtained of the Secretary (THOS. F. FLOWMAN, 4, Terrace Walk, Bath), and, in applying for forms, Exhibitors are requested to state how many Entries they wish to make of either Horses, Cattle, Sheep, Pigs, &c., as each Stock Entry must be made on a separate Form.

Conditions and Regulations.

8. Every Exhibitor or Competitor is requested to carefully examine the List of Prizes and Conditions, as he will be held responsible for the correctness of his Certificate of Entry. An Exhibitor omitting to give information asked for on the Entry-form, with regard to the age, breeder, name, colour, sire, dam, &c., of an Animal, will be liable to have his Entry disqualified.

9. If an Exhibitor or Competitor fails, when called upon by the Stewards or Council, to prove the correctness of his Certificate of Entry to their satisfaction, the Entry may be disqualified, and any award made to it cancelled.

10. An Exhibitor who has made, in due time, an Entry of Horses, Cattle, Sheep, or Pigs in a particular Class, will be permitted, up to Friday, April 28, to withdraw the Entry of such Animal, and to substitute for it the Entry of another Animal in the same Class, on payment of the difference, if any, between the amount of the Entry-fee originally paid for the Animal withdrawn, and the post Entry-fee.

11. An Animal can be entered in as many Classes as it is eligible for on payment of an additional Fee in each Class. No additional Fee is, however, payable in the case of Special Prizes for Exhibits already entered in any particular Class.

12. Every Exhibit must be the *bonâ fide* property of the Exhibitor both at the time of Entry and on the first day of the Exhibition.

SHOWYARD.

13. The Yard will be open for the reception of Horses (see Regulation 2 for Harness Horses), Cattle, Sheep, and Pigs, on Monday and Tuesday, May 22 and 23, from 7 A.M. to 6 P.M. Horses will also be received from 6 to 8 o'clock on the morning of the first day of Show, but all other Stock Entries must be in the Yard the previous day. A Label denoting the number of each Entry will be sent by the Secretary, and must be securely affixed to the head of the Animal, or, in the case of other Exhibits, to the receptacle containing such Exhibits.

14. All Live Stock (see Conditions 2, 38, and 39 for exceptions with regard to Horses) must remain in their places in the Showyard until after six o'clock in the afternoon of the last day of the Show, and shall under no circumstances be taken out of their places in the interval without the special permission of the Stewards.

15. All Exhibits and all persons in charge of the same, will be subject to the Orders, Regulations, and Rules of the Society, and the Stewards shall have the power to remove from the Yard the Stock or property belonging to, and to cancel the admission ticket of, any Exhibitor who shall infringe any of the Regulations or Conditions of the Meeting, or who shall refuse to comply with any instructions given by the Stewards, without any responsibility attaching to the Stewards or the Society in consequence of such removal.

16. The carriage of Exhibits must in all cases be paid by the Exhibitor. No exhibit subject to charges will be received by the Officers of the Society.

17. No Animal shall be decorated with colours other than the Society's Prize Rosettes.

18. No person shall be allowed to fix any placard, or to take down any official placard in the Yard without the written permission of the Stewards.

19. All persons in charge of Exhibits will be subject to the orders of the Stewards, and will be required to parade or exhibit the Animals in their charge at such times as may be directed by the Stewards. Servants must be in attendance each day during the Show at least a quarter of an hour before the time appointed for exhibiting the Animals under their charge in the Show-rings. Owners of Animals exhibited will be held responsible for the behaviour

of their Servants, and for the consequences of any misconduct of such Servants.

20. Servants in charge of Stock at night must, if they leave the Yard, return before 10 P.M., or they will not be admitted.

21. Hay, straw, and green food will be supplied by the Society free of expense to Exhibitors at the Forage Stores in the Showyard. Servants must apply at the Forage Stores for their Forage Tickets after they have brought their Animals into the Yard. Corn, meal, and cake can be obtained in the Showyard at fixed prices.

NOTE.—For the convenience of Exhibitors wishing to sell their Animals, a Register will be kept at the Secretary's Office, in which they may enter the prices.

TICKETS.

22. Each Exhibitor of Live Stock will have a Free Ticket of admission to the Showyard sent to him, except in the case of a Member of the Society, who will receive his Member's Ticket in lieu of an Exhibitor's Ticket. Tickets for the use of Servants in charge of Live Stock will also be sent, and the Exhibitor will be held responsible for the proper use of such Tickets. In case of transfer or other improper use of a Ticket, the Exhibitor will be required to pay a fine of 1*l.* for each case. Exhibitors will be held responsible for the attendance at each Parade of as many Servants as Tickets have been issued for.

RESPONSIBILITY.

23. Neither the Society nor any of its Officers or Servants shall be in any way responsible or accountable for anything that may happen (from any cause or circumstance whatever) to Exhibitors or their Servants, or to any Animal or Article exhibited, or property brought into the Showyard, or otherwise for anything else in connection with, or arising out of, or attributable to, the Society's Show, or these or any other Conditions or Regulations prescribed by the Society in relation thereto.

24. Each Exhibitor shall be solely responsible for any consequential or other loss, injury, or damage done to, or occasioned by, or arising from, any Animal or Article exhibited by him, and shall indemnify the Society against all legal or other proceedings in regard thereto.

25. The Society, its Officers, and Servants, will not be liable for any errors or mistakes that may happen in placing or penning the Stock or Articles to be exhibited, but the Servants in charge of the same must see that they are placed or penned according to their Entries.

DISQUALIFICATIONS.

26. No Animal which has been exhibited as Fat Stock at any Show shall be eligible to compete for the Prizes offered in this Prize Sheet.

27. No Animal which has taken a First Prize at any Meeting of this Society can compete again in the corresponding Class.

28. An Animal having any unsoundness likely to be transmitted to its progeny, shall be disqualified thereby from receiving any Prize offered by or through the Society.

29. If it shall be proved to the satisfaction of the Stewards or Council that an Exhibitor or Competitor has knowingly signed an incorrect Certificate, or knowingly given an incorrect Pedigree of any Animal, or has attempted to enter an Animal or other Exhibit, or to obtain a Prize by any other unfair means at this or any other Agricultural Society's Meetings, or is under exclusion from any Breed Society for fraudulent practices, the Council

have the power to cancel all awards made to such Exhibitor or Competitor and to disqualify him or her from exhibiting or competing at future Meetings of the Society.

PENALTIES.

30. As the non-exhibition of Animals entered for the Show causes unnecessary preparations and expense, and disarranges the Showyard, any person entering Stock, and failing to exhibit the same shall pay a penalty of 10s. for each Entry, unless a Certificate, under the hand of the Exhibitor or his authorised Agent, be lodged with the Secretary of the Society, before the day of Exhibition, certifying that such non-exhibition is caused either by— (1) the death of the animal or animals; or (2) contagious or infectious disease (confirmed by the explanatory Certificate of a Veterinary Surgeon); or (3) by its becoming ineligible for the Class in which it has been entered.

31. Every Exhibitor will be required to undertake to forfeit and pay to the Society the sum of 20*l.*, as and for liquidated damages, if any Animal which he exhibits be, to his knowledge, suffering from any contagious or infectious disease, and the Stewards are empowered to prevent the entry of any diseased Animal into the Yard, or to have it removed therefrom.

32. Any infringement of any of these or any other prescribed Regulations or Conditions will subject the Exhibitor to a fine of 1*l.* by the Stewards, and to the forfeiture, by order of the Council, of any Prize to which he may be entitled (in addition to all other consequences attaching to such infringement).

AWARDS.

33. The Society reserves to itself the right to withhold any Prize, if, in the opinion of the Stewards, the conditions and regulations have not been properly complied with.

34. No Second Prize will be given in any Class of Stock unless there are three Entries exhibited, no Third Prize unless there are six Entries exhibited, and no Fourth Prize unless there are nine Entries exhibited, except in the case of sufficient merit and on the special recommendation of the Judges, with the approval of the Steward of the Department, at the time of Judging the Class.

35. Only the signed Awards of the Judges are accepted by the Society as evidence that a Prize has been awarded, and the production of the Prize-card or the rosette by an Exhibitor will not entitle him to the Prize.

36. The Certificate of the Veterinary Inspector, whether as to age or soundness, shall be required only in cases where the Judges are in doubt, or where the Stewards may consider it necessary. The decision of the Inspector in such cases shall be final and conclusive; and in case it shall be against the Animal to which a Prize has been awarded, such Animal shall be disqualified from receiving such Prize.

PROTESTS.

37. Any Exhibitor wishing to lodge a protest having reference to Live Stock exhibited at this Meeting must make the same in writing on a form to be obtained from the Secretary and deposit with him the sum of 3*l.* If on investigation the protest is not sustained to the satisfaction of the Stewards, the sum thus deposited shall, at the discretion of the Council, be forfeited to the funds of the Society. All protests must be delivered at the Secretary's Office in the Showyard, on the day on which the award is made, and no protest will be subsequently received, unless a satisfactory reason be assigned for the delay. The Stewards will consider such protests at Eleven o'clock on

the following day at the Secretary's Office, at which time and place any person making a protest must attend or be represented by his authorised agent. The decision of the Stewards shall be final.

APPLYING TO CERTAIN CLASSES ONLY.

HORSES.

38. Horses can be removed from the Yard at night on deposit by the Exhibitor of 3*l*. at the Finance Office, which sum will be forfeited if the Horse does not return at 8 A.M. each day during the Exhibition. This regulation does not apply to Harness Horses.

39. The Stallions in Classes 1 and 2 are not required to remain in the Yard longer than 6 o'clock in the evening of the third day of the Show.

40. Exhibitors must provide saddles for Horses in Classes 12, 16, 17, 19, 20, 23, 24, and 25, as they are to be ridden; and vehicles and harness for those in Classes 26 to 35, which are to be driven.

41. No Horse, unless a Foal, will be admitted into the ring without a proper bit.

42. The Prizes for Stallions in Class 1 will be withheld until a Certificate from the owner is delivered to the Secretary that the Horse has served at least 20 Mares during the current season.

43. All Foals must be the offspring of the Mares with which they are exhibited, and the name of the Sire of the Foal must be stated on the Certificate of Entry.

44. Mares entered as in-Foal shall hereafter be certified to have produced a living Foal before the 1st August of the year of the Show. If the required Certificate, which must be on a form obtainable from the Secretary, is not received by September 30, 1899, the Prize awarded will be forfeited.

45. Horses may, at the discretion of the Stewards, be measured, and the measurement shall be taken in the shoes worn by the Entry at the time of judging.

46. The following special conditions apply only to the Prize offered by the Shire Horse Society, viz.: the owner of the Animal entered to have been a Member of the Bath and West and Southern Counties Society for not less than six months previous to April 10, 1899; a Mare six years old, or upwards, to have had a living Foal; no Animal to compete which has won the Shire Horse Society's Gold Medal during the current year, the Royal and London Shows being excepted; the winning Animal to be entered, or eligible for entry, in the Shire Horse Society's Stud Book; and a Certificate that she is free from hereditary disease to be lodged with the Secretary of the Shire Horse Society, the Veterinary examination to be made on the ground by the Veterinary Inspector appointed for the Show.

47. The following Special Conditions apply only to the Prize offered by the Hunters' Improvement Society for Hunter Brood Mares, viz.:—The Mare awarded the Medal must be registered in the Society's Record of Hunter Mares and Sires (or entered for Volume VIII.), and not having previously won the Hunters' Improvement Society's Gold Medal or Premium as a Brood Mare, possessing a Certificate of soundness from hereditary disease, signed by the Society's appointed Veterinary Inspector, who must be a Member of the Royal College of Veterinary Surgeons, after his examination of the Animal on the Show Ground. In the case of Mares entered as "in-foal," a further Certificate of foaling must also be lodged with the Secretary of the Hunters' Improvement Society before the award will be confirmed.

NOTE.—If the Judges select a Brood Mare whose Entry for the Record was lodged before the date of the Associated Society's Show, the Prize will be increased to a Gold Medal and 17., or 5l. and a Silver Medal.

48. The following Special Conditions apply only to the Prize offered by the Hunters' Improvement Society for Hunter Filly. The Filly awarded the Medal must be registered in the Society's Record of Hunter Mares and Sires (or entered for Volume VIII.), and not having previously won the Hunters' Improvement Society's Silver Medal in 1899, possessing a Certificate of soundness from hereditary disease, signed by the Society's appointed Veterinary Inspector, who must be a Member of the Royal College of Veterinary Surgeons, after his examination of the Animal on the Show Ground.

NOTE.—If the Judges select a Filly whose Entry for the Record was lodged before the date of the Associated Society's Show, the Prize will be increased to a Silver Medal and 17.

49. The following Special Conditions apply only to the Prize offered by the Hunters' Improvement Society for best Hunter of either sex. The Hunter awarded the medal must possess a Certificate of soundness from hereditary disease signed by the Society's Veterinary Inspector, who must be a member of the Royal College of Veterinary Surgeons, after his examination of the Animal on the Show Ground; and must be entered in the Record; if a Mare is selected she must be registered in Volume VIII.; if a Colt or Gelding is selected the Dam must be registered in Volume VIII. before the award will be confirmed. No animal may take more than one of these medals during 1899.

CATTLE.

50. All Cattle must be properly secured to the satisfaction of the Officers of the Society, on being brought to the gate of the Yard, or they will not be admitted.

51. All Bulls must have a ring or clamp attached to the nose, and in the ^{se} ~~the~~ ^{are} ~~are~~ Classes must be provided with a strong chain, and be led with a proper stick.

52. All Cattle will be required to be paraded in the ring at least once ^a ~~a~~ day at the discretion of the Stewards.

53. No Bull calved before January 1, 1897, will be eligible to receive ^a ~~a~~ Prize until certified to have served not less than six different Cows ^{or} ~~or~~ Heifers), previous to June 1st, 1899, and to be the sire of live Calves ^{es} ~~es~~ dropped in the year 1899.

54. No Cow or Heifer, entered as in-milk, will be eligible to receive a Prize ^{ze} ~~ze~~ until certified to have had a living Calf within the fifteen months preceding ^{ing} ~~ing~~ the date of Show, or that the Calf, if dead, was born at the proper time.

55. No Cow or Heifer, entered as in-Calf, will be eligible to receive ^s ~~s~~ a Prize until certified to have produced a living Calf before January 1, 1900 ⁰⁰ ~~00~~ or that the Calf, if dead, was born at full time before that date. If ^{he} ~~he~~ required Certificate, which must be on a form obtainable from the Secretaries ^{ry} ~~ry~~ is not received by February 1, 1900, the Prize awarded will be forfeited.

56. Every Cow or Heifer in-milk shall be milked dry in the Showyard ^{at} ~~at~~ 6 p.m. on the evening preceding the day of judging, or, in the Milk ^{and} ~~and~~ Butter Test Classes, at such hours as the Stewards may appoint, in the presence of an Officer of the Society appointed for the purpose.

57. Any Animal in the Cattle Classes found to be artificially coloured ^{will} ~~will~~ be disqualified.

58. Any person selling Milk in the Yard, except in the place appointed ^{by} ~~by~~ the Stewards, will be fined 5s. for each infringement of this Regulation.

59. The Blythwood Challenge Bowl when won two years in succession or three years at intervals, by different animals belonging to the same Exhibitor, will become absolutely his property. Any Animal having been awarded one of the "Blythwood Bowls" in 1899 will not be eligible to compete for a second in the current year. The possessor of the Bowl must give security to the Society that it shall be delivered up to the Secretary 14 days before the commencement of the Society's Show the following year; and in the event of the same Exhibitor not being the winner of the Bowl the second year, a silver Medal will be given him by Sir James Blyth, as a memento of his success in the previous year.

60. The Challenge Cup offered by the Duke of Marlborough must be won twice by the same Exhibitor before becoming his absolute property. The possessor of the Cup must give security to the Society that it shall be delivered up to the Secretary 14 days before the commencement of the Society's Show the following year.

61. Except in the Local and Dairy Classes, every Animal entered for Competition must be entered, or certified as eligible to be entered, in the Herd Book of its Breed, where such Herd Book exists, and has been in existence for not less than seven years. Where an Animal is entered by the Exhibitor as eligible for Entry in the Herd Book of its Breed, proof of such eligibility must be furnished to the Secretary at the time of making the Entry.

SHEEP.

62. All Sheep (except those in the Exmoor and Dartmoor Classes, which must be shown in their wool) over one year old must have been really and truly shorn bare on or after the 1st of March, 1899. If the Judges consider that a Sheep has not been shorn bare they will report this to the Stewards, with a view to its disqualification.

63. Each pen of Ewes must be of the same Flock.

PIGS.

64. The Pair of Pigs in each pen must be of the same litter.

65. All Sows farrowed before 1899 shall be certified to have had a litter of live Pigs within six months preceding the first day of exhibition, or to be a Sow-Pig at the time of entering, so as to produce a litter of Pigs, farrowed at their proper time, before the 1st of September following. In the case of a Sow-Pig the Prize will be withheld until the Exhibitor shall have furnished the Secretary with a certificate of farrowing as above. If the required Certificate, which must be on a form obtainable from the Secretary, is not received on or before the 15th September following, the Prize awarded will be forfeited.

66. All Pigs exhibited with a Sow shall be her own produce, of the same litter, and not exceeding two months old at the time of the Show.

67. No Sow above 18 months old that has not produced a litter of live Pigs shall be eligible to compete in any of the Classes.

68. Any Animal in the Pig Classes found to be artificially coloured will be disqualified.

CIDEE, DAIRY PRODUCE, MILKING, AND SHOEING.

For Conditions and Regulations see Entry-Forms.

ADJUDICATION OF PRIZES.

69. The Judges are instructed as follows, and Entries are received subject to this :—

a. Not to award any Prize or Commendation unless the Entry possesses sufficient merit.

b. Not to award a Prize to any Horse or Mare unless it is free from unsoundness likely to be transmitted to its progeny ; or if a Gelding, unless free from unsoundness ; in either case, an accident having temporary consequences only excepted.

c. In awarding Prizes to Cattle, Sheep, and Pigs, to decide according to the relative merits of the Animals for Breeding purposes, and not to take into consideration their present value to the butcher.

d. To make the milking capacity and form of udder one of the chief points in awarding prizes to pure bred Short-Horn Cows and Heifers.

e. To draw the attention of the Stewards to any Exhibit that has been improperly prepared for exhibition or is wrongly entered.

f. To report to the Stewards for disqualification any Sheep which in their opinion has not been shorn bare.

g. To give in a "RESERVED NUMBER" in each Class, indicating the Animal or Exhibit which in their opinion possesses sufficient merit for the Prize, if the Animal or Exhibit to which the Prize is awarded should become disqualified. Should the "Reserve Number" succeed to a Prize, and be itself disqualified, the Prize will be forfeited.

h. Immediately after the Judging to deliver to the Stewards on the special sheets, to be obtained at the Secretary's Office, their awards, signed, stating the numbers to which the Prizes are adjudged, and noting all disqualifications.

70. Should any question arise upon which the Judges may desire a further opinion, the Stewards shall provide them with a Referee.

PAYMENT OF PRIZES.

71. Cheques for the Prizes awarded (except where further qualification of an Animal is required) will be drawn at the meeting of the Finance Committee held in July, 1899, and will then be forwarded by post to the Exhibitors to whom they have been awarded.

INTERPRETATION OF CONDITIONS.

. The Society reserves to itself by its Council the sole and absolute right to interpret these or any other prescribed Conditions and Regulations, or Prize Lists, and to arbitrarily settle and determine all matters, questions, or differences in regard thereto, or otherwise arising out of or connected with or incident to the Show. Also to refuse and to cancel any Entries, disqualify exhibitors, prohibit exhibition of Entries, vary or cancel awards of Prizes or Medal Numbers, and relax Conditions, as the Society may deem expedient.

RAILWAY ARRANGEMENTS.

The Railway Companies offer special facilities for the CONVEYANCE OF EXHIBITORS to and from the Show, and particulars of these will be supplied to exhibitors by the Secretary.

Geographic Address—"PLOWMAN," BATH.

EXETER MEETING,

MAY 24, 25, 26, 27, AND 29, 1899.

PRIZES FOR POULTRY.

CLASS	First Prize.	Second Prize.
	£ s.	s. d.
1.—COCHIN—Cock	1 10	15 0
2.—Ditto—Hen	1 10	15 0
3.—BRAHMA—Cock	1 10	15 0
4.—Ditto—Hen	1 10	15 0
5.—LANGSHAN—Cock	1 10	15 0
6.—Ditto—Hen	1 10	15 0
7.—PLYMOUTH ROCK—Cock	1 10	15 0
8.—Ditto—Hen	1 10	15 0
9.—WYANDOTTE—Cock	1 10	15 0
10.—Ditto—Hen	1 10	15 0
11.—ORPINGTON—Cock	1 10	15 0
12.—Ditto—Hen	1 10	15 0
13.—MINORCA (White)—Cock	1 10	15 0
14.—Ditto—Hen	1 10	15 0
15.—MINORCA (other than White)—Cock	1 10	15 0
16.—Ditto—Hen	1 10	15 0
17.—LEGHORN—Cock	1 10	15 0
18.—Ditto—Hen	1 10	15 0
19.—HAMBURG—Cock	1 10	15 0
20.—Ditto—Hen	1 10	15 0
21.—DORKING (Coloured)—Cock	1 10	15 0
22.—Ditto—Hen	1 10	15 0
23.—DORKING (Silver Grey)—Cock	1 10	15 0
24.—Ditto—Hen	1 10	15 0
25.—DORKING (White or Cuckoo)—Cock	1 10	15 0
26.—Ditto—Hen	1 10	15 0
27.—OLD ENGLISH GAME—Cock	1 10	15 0
28.—Ditto—Hen	1 10	15 0
29.—INDIAN GAME—Cock	1 10	15 0
30.—Ditto—Hen	1 10	15 0
31.—MALAY—Cock	1 10	15 0
32.—Ditto—Hen	1 10	15 0
33.—FRENCH—Cock	1 10	15 0
34.—Ditto—Hen	1 10	15 0
35.—ANY OTHER DISTINCT BREED (not previously mentioned)—Cock	1 10	15 0
36.—Ditto—Hen	1 10	15 0
SPECIAL PRIZES.		
Offered by Captain J. C. Best.		
37.—ANY DISTINCT BREED—Cock and four Hens, bred in 1898 or 1899, the property of one Exhibitor. The Birds will be exhibited in an open run	£5	£3

CHICKENS OF 1899.	First Prize.	Second Prize.	Third Prize.
	£ s.	s. d.	s. d.
in, Brahma, Langshan, Plymouth Rock, Wyandotte, or Orpington—Cockerel	1 10	15 0	10 0
—Pullet	1 10	15 0	10 0
ra, Leghorn, Hamburg, or French—Cockerel	1 10	15 0	10 0
—Pullet	1 10	15 0	10 0
ing, Game, Malay, or any other Distinct (not previously mentioned)—Cockerel	1 10	15 0	10 0
—Pullet	1 10	15 0	10 0
LIVE TABLE POULTRY.			
of Cockerels of 1899, of any Pure Breed	1 10	15 0	10 0
—Pullets	1 10	15 0	10 0
of Cockerels of 1899, of a first cross from any Pure Breeds	1 10	15 0	10 0
—Pullets	1 10	15 0	10 0
SELLING CLASSES.			
DISTINCT BREED—Cock (<i>price not to exceed 1s.</i>)	1 10	15 0	10 0
DISTINCT BREED—Hen (<i>price not to exceed 1s.</i>)	1 10	15 0	10 0
DUCKS, GEESE, AND TURKEYS.			
of DUCK (Aylesbury)	1 10	15 0	10 0
of (Rouen)	1 10	15 0	10 0
of (Pekin)	1 10	15 0	10 0
of DER	1 10	15 0	10 0
of IE	1 10	15 0	10 0
of KEY—Cock	1 10	15 0	10 0
—Hen	1 10	15 0	10 0
DEAD TABLE POULTRY.			
<i>rewarded alive, and to be killed and plucked by a member acting for the Society. See Regulation 12.)</i>			
of Cockerels of 1899, of any Pure Breed	1 10	15 0	10 0
—Pullets	1 10	15 0	10 0
of Cockerels of 1899, of a first cross from any Pure Breeds	1 10	15 0	10 0
—Pullets	1 10	15 0	10 0
of Ducklings of 1899	1 10	15 0	10 0

POULTRY.

CONDITIONS AND REGULATIONS.

CHARGES, &c.

1. Exhibitors may make an unlimited number of Entries in each Class on payment of Fees as follows :—

	Members.		Non-Members.	
	s.	d.	s.	d.
Classes 1 to 56	2	6	5	0
Dead Poultry Classes, 57 to 61	1	0	2	6

The above Fees include coops, food, and attendance.

N.B.—The above Fees *must* be sent with the Entries, or no notice will be taken of the latter.

2. The privilege of entering at Member's Fees is strictly limited to Members of the Society, or of the Devon County Agricultural Association, elected on or before January 31, 1899, and subscribing not less than 1*l.* annually.

3. All Entries must be made on the printed forms, to be obtained of the Secretary (THOS. F. PLOWMAN, 4, Terrace Walk, Bath), and such forms must be correctly filled up and returned to the Secretary, together with all Fees due, on or before April 29. Exhibitors are requested to carefully examine the List of Prizes and Conditions, as the Society cannot be responsible for any errors made by Exhibitors in the Entry-forms, and birds entered in a wrong Class will be necessarily excluded from competition. No alterations can be made in Entry-forms after they have been received by the Secretary.

4. The Council reserve the right to refuse the Entries of any person.

5. Exhibitors must state the price and breed of their birds on their Entry-forms.

SHOWYARD.

6. All birds must be in the Showyard by 6 P.M. on *Tuesday, May 23*, and no bird can be removed before Monday, May 29, at 7 P.M. Any Exhibitors who send for their birds must do so between 7 and 8 P.M. on that day.

7. All carriage must be prepaid to Exeter Railway Station, otherwise the birds will not be received at the Exhibition; but they will be conveyed free of expense from the Station to the Showyard and back.

8. No Exhibitor or Servant will be allowed into the tent until the birds have been judged.

9. The Poultry Tent will not be open to the public until 2 o'clock on the first day of the Exhibition.

10. A Non-Transferable Admission Ticket for the Exhibition will be sent to each Exhibitor whose Entry-fees amount to 1*l.* and upwards.

TABLE POULTRY.

11. In these Classes (44 to 47 and 57 to 61) quality for the table will be considered before mere weight. The date of hatching must be given, and, in the case of cross-bred birds, the breeds of the parents.

12. In Classes 57 to 61 the whole of the birds will be first exhibited alive. They will all be killed on the evening of Wednesday, May 24, and trussed by a qualified Poulterer, the Prizes being finally awarded to the dead birds. These will then all be exhibited, but will be withdrawn from exhibition when considered necessary, and, if unsold, will be returned to Exhibitors after 6 P.M. on Friday, May 26.

bidders are recommended to put a reasonable price upon their Exhibits in these sales so as to promote the sale of them.

SALES.

3. All birds may be claimed, at the price put upon them, any time after 4 o'clock Wednesday, May 24, and a sale *must take place* if the price stated be paid to the clerk in the Poultry Office at the time of claiming. *No alteration can be made in prices stated on the Entry-forms* and in the Catalogue until after Friday, May 26, when the price may be reduced on payment to the Stewards of 1s. per pen each alteration. Birds must be *sold in pens*, and the price stated must include basket. A charge of 10 per cent. will be made for all birds sold. The persons who have the management of the sales cannot take charge of birds which are disposed of privately.

AWARDS.

14. Except under a special recommendation from the Judges, no Second Prize will be given in any of the Classes unless there are three Entries, and no Third Prize unless there are six Entries.

DISQUALIFICATIONS.

15. The Judges are empowered to withhold a prize or prizes where birds are not considered of sufficient merit, or to disqualify any that have been clipped, dubbed, plumed, trimmed, marked, or dyed, and an Exhibitor detected in a false statement as to the age, &c., of any bird, or in any other practice calculated to deceive or mislead the Judges or Stewards, shall forfeit all or any Prizes awarded to him or her at the Show, and will be disqualified from competing at any future Show of the Society.

16. No person who shall have been shown to the satisfaction of the Council to have been excluded from exhibiting for Prizes at the Exhibition of any other Society in consequence of having attempted to obtain a Prize by giving a false Certificate, or by other unfair means, and no person who is under exclusion from any Breed Society for fraudulent practices, shall be allowed to exhibit at this or any other Meeting of the Society.

17. Unhealthy birds will not be exhibited, but will be immediately returned to their owners, and the Fees will be forfeited.

PROTESTS.

18. In order to check frivolous and vexatious protests, no protest will be entertained unless accompanied by a deposit of 1*l.* in each case; and in case the protest is not substantiated, the deposit may be forfeited to the funds of the Society. All protests must be made before 12 o'clock (noon) on Thursday, May 25.

FORFEITS.

19. Persons entering birds, and failing to send the same to the Exhibition, will forfeit the entrance Fee for each pen so left vacant.

GENERAL.

20. All birds shown must be *bonâ fide* the property of the Exhibitor.

21. For each pen entered, the Exhibitor will receive a Label, on the reverse side of which he must legibly write his name and address for the return journey.

22. All Eggs laid at the Exhibition will be destroyed.

23. The Stewards pledge themselves to take every care of the birds exhibited, but neither they nor the Society will, in any case, be responsible for any accident, loss, or damage, from whatever cause arising, the Exhibits being entered at the sole risk of the

Exhibitors, and Exhibitors will be required to hold the Society harmless in the event of loss.

24. In case of death of any bird during the Exhibition, it will be sent back for the inspection of the Exhibitor.

25. The Poultry Department is subject to the Rules and Regulations of the Society and its Officers.

* * *The use of properly-constructed Poultry Baskets will facilitate the safe and speedy conveyance of the birds to and from the Exhibition.*

The Society cannot, under any circumstances, undertake to send telegrams to Exhibitors as to Judges' Awards.

Applications for Catalogues (price 1s. each) and printed lists of Awards should be made only to the Publishers, Messrs. W. LEWIS AND SONS, Herald Office, Bath.

By Order of the Council,

THOMAS F. FLOWMAN, Secretary.

4, Terrace Walk, Bath.

Telegraphic Address—"FLOWMAN, BATH."

FINANCIAL STATEMENTS

FOR

1898

WITH ITEMS OF 1897 FOR COMPARISON.

	PAGES
Summary of the Cash Account	cxiv., cxv.
Detailed Cash Account	cxvi.-cxvii.
Assets and Liabilities	cxviii.

uthern Counties Society.**THE YEAR ENDING DEC. 31st, 1898.****MENT FOR 1897.****CR.**

PAYMENTS.	1898. CARDIFF.		1897. SOUTHAMPT'N.	
	£	s. d.	£	s. d.
General Expenses :—				
Salaries	775	0 0	775	0 0
Rent, Postage, Stationery, &c.	216	16 5	259	6 6
Journal	413	18 4	434	8 5
		1,405 14 9	1,468	14 11
Show Expenses :—				
Implements	602	11 3	509	3 8
Horses	1,011	7 2	850	0 2
Cattle, Sheep, and Pigs	2,198	7 10	2,317	10 5
Fodder, &c.	428	11 10	419	6 4
	3,638	6 10	3,586	16 11
Poultry	251	11 6	249	7 3
Shoeing	97	2 8	88	5 11
Arts	218	9 10	207	1 0
Art Union	174	1 4	174	3 9
Art-Manufactures	66	16 0	70	16 7
	459	7 2	452	1 4
Music	285	3 2	222	3 0
Horticulture	169	7 2	159	6 8
Cheese and Butter	274	2 1	379	0 1
Working Dairy	409	3 9	455	4 8
Shearing . . . . .	..		37	7 6
Cider	63	8 11	68	7 9
Bees . . . . .	..		10	0 0
Public Announcements	402	11 10	416	4 1
Refreshment Contracts	212	16 5	235	8 0
Unapportionable :—				
Stand Fittings	61	16 2	64	7 0
Erection of Offices, &c.	757	17 10	1,077	14 9
Carriage of Plant	127	5 2	135	1 4
Police	96	7 6	106	15 0
Miscellaneous	246	8 7	346	6 0
	1,289	15 3	1,730	4 1
		8,155 8 0	8,599	0 11
Schools . . . . .	..	1,290 18 11	1,933	9 3
Experiments . . . . .	..	601 0 5	716	19 2
		11,453 2 1	12,718	4 3
Balance in Bank, Dec. 31 . . . . .	..	373 16 3	120	12 1
		£11,826 18 4	12,838	16 4

ed and found correct,
ALBERT GOODMAN, F.C.A.,
Auditor.

Passed by Council,
January 31st, 1899.
TH P PLAU AW

The Bath and West of

Dr. CASH ACCOUNT FOR THE YEAR ENDING DEC. 31

RECEIPTS.		1898. CARDIFF.	1897. SOUTH.
		£ s. d.	£
DIVIDENDS AND INTEREST:—			
Consols		96 0 0	100
New Zealand Stock		53 1 0	53
India Stock		160 3 2	213
Canada Stock		69 4 8	69
Queensland Stock		106 7 8	106
New South Wales Stock		67 15 2	67
		552 11 8	610
SUBSCRIPTIONS FROM MEMBERS:—			
Arrears		55 18 6	56
Governors		222 17 0	222
Subscribers of £1 and upwards		632 18 0	841
Ditto of 10s.		21 11 0	20
		1,333 4 6	1,151
LIFE COMPOSITIONS . . . . .		..	30 0 0
JOURNAL:—			
Sales		12 11 9	12
Advertisements		27 3 8	28
		39 15 5	40
MISCELLANEOUS . . . . .		..	..
IMPLEMENTS:—			
Entry Fees		62 10 0	60
Fees for Space:—			
Machinery-in-Motion Shedding		324 7 0	301
Ordinary		350 0 0	300
Miscellaneous		392 0 0	263
Boarded		254 5 0	241
Reed		49 5 0	36
Uncovered Ground		132 19 2	122
Catalogue Fees		117 5 0	117
		1,601 11 2	1,563
Carried forward . . . . .		..	2,447 2 9

Southern Counties Society.**1898, WITH COMPARATIVE STATEMENT FOR 1897.****CR.**

PAYMENTS.		1898. CARDIFF.		1897. SOUTHAMPT'N.	
		£ s. d.	£ s. d.	£ s. d.	£ s. d.
GENERAL:—					
Salaries:—					
Secretary (including Clerks, Gas, Coal, Lodgings at Show, &c.)		700	0 0	700	0 0
Auditor		20	0 0	20	0 0
Consulting Chemist		30	0 0	30	0 0
Consulting Botanist		25	0 0	25	0 0
		775 0 0		775 0 0	
Printing		34	19 11	37	11 3
Stationery and Finance Books		31	8 4	44	7 9
Postage, Telegrams, Cheque and Receipt Stamps		67	10 4	66	10 9
Rent of Offices		26	0 0	26	0 0
Travelling Expenses		28	4 11	28	19 6
Carriage of Goods		7	16 6	11	7 6
Directories and Reference Books		3	0 4	5	11 6
Finance Committee's Expenses		1	12 0	15	13 9
Subscriptions		3	3 0	3	3 0
Repairs, &c.		9	13 1	15	17 6
Hire of London Rooms for Councils and Committees		3	8 0	4	4 0
		216 16 5		259 6 6	
JOURNAL:—					
Editor		100	0 0	100	0 0
Associate Editor		100	0 0	100	0 0
Printing and Binding		145	13 6	157	5 4
Plans		3	14 6	3	14 6
Journal Distribution		27	15 7	31	5 3
Postage, Stationery, Reference Books, &c.		5	19 9	7	10 4
Payments to Authors		30	15 0	34	13 0
		413 18 4		434 8 5	
IMPLEMENTS:—					
Shedding		486	7 3	423	4 0
Stewards and Assistants		77	5 0	60	2 8
Printing, Stationery, &c.		35	15 2	25	17 0
Fees returned		3	3 10	..	
		602 11 3		509 3 8	
Carried forward		2,008 6 0			

CARDIFF MEETING, 1898.

(cxviii)

DR.

CASH ACCOUNT—continued.

RECEIPTS.		1898. CARDIFF.		1897 SOUTHEAST
		£	s. d.	£
Brought forward		..	3,447 2 9	
HORSES, CATTLE, SHEEP, AND PIGS:—				
Horses:—Entry Fees	£ s. d. 138 5 0			109
Fines and Forfeits	3 0 0			3
Grand Stand Admissions	86 1 9			58
Special Prizes	107 0 0			30
		334	6 9	190
Cattle, Sheep and Pigs:—				
Entry Fees	283 0 0			350
Fines	15 11 0			17
Special Prizes	131 10 0			81
		430	1 0	449
Catalogues	80 0 0			80
Fodder	3 16 6			0
		83	16 6	81
			848 4 3	721
POULTRY:—				
Entry Fees		103	12 6	98
Special Prizes		1	1 0	2
Commission on Sales		1	12 6	109
			106 6 0	
SHOEING:—				
Entry Fees		..	21 0 0	14
Carried forward		..	4,432 13 0	

CASH ACCOUNT—*continued.*

CR.

PAYMENTS.	1898. CARDIFF.		1897. SOUTHAMPT'N.	
	£	s. d.	£	s. d.
Brought forward . . . .	..	2,008 6 0		
CATTLE, SHEEP, AND PIGS:—				
-Prizes	£	s. d.		
Shedding and Grand Stand	631	0 0	477	0 0
Stewards and Assistants	272	8 3	309	10 10
Judges	52	16 3	41	6 4
	55	2 8	22	3 0
		1,011 7 2	850	0 2
-Prizes	£	s. d.		
Less deferred	1,108	10 0	1,101	10 0
	10	0 0	35	0 0
	1,098	10 0	1,066	10 0
-Prizes	375	0 0	448	0 0
Less deferred	172	0 0		
	3	0 0	222	0 0
	169	0 0		
Shedding and Canvas . .	352	7 6	391	12 4
Stewards and Assistants .	39	5 4	32	11 6
Judges	164	5 0	156	16 7
	2,188	7 10	2,317	10 5
&c.	115	12 2	42	4 8
and Insurance	168	19 5	221	8 1
of Fodder and Assistants				
horse hire	12	18 6	22	7 4
ary Inspector	28	15 0	27	7 0
s	10	1 3	7	10 5
g and Stationery	66	14 6	58	17 11
ments to Judges	9	16 0	9	10 11
d Prizes of 1897	15	0 0	30	0 0
urned	0	15 0	..	
	428	11 10	419	6 4
		3,638 6 10	3,584	16 11
—				
e, Staging and Sheds . . .	65	10 0	57	15 0
s and Assistants	17	14 6	19	1 1
.	13	3 6	12	9 0
.	142	13 0	145	15 0
g, Stationery, Carriage, &c.	12	10 6	14	7 2
	251	11 6	249	7 3
—				
.	22	0 0	22	0 0
.	20	0 6	18	6 0
Forges, Coals, Horses, and Printing.	8	9 1	6	19 10
g	39	15 0	32	10 0
and Assistants	6	18 1	8	10 1
	97	2 8	88	5 11
Carried forward . . . .	..	5,995 7 0		

Dr.

CASH ACCOUNT—continued.

RECEIPTS.		1898.		189
		CARDIFF.		SOUTH
		£	s. d.	£ s
Brought forward		..	4,422 13 0	
ARTS:—				
Catalogues		5 0 0		5
Commissions on Sales		5 10 3		0
			10 10 3	5
ART UNION:—				
Sale of Tickets		84 1 0		81
Excess paid on Prizes		5 1 0		7
			89 2 0	89
ART-MANUFACTURES:—				
Fees for Space		..	112 10 0	89
CHEESE AND BUTTER:—				
Entry Fees		75 18 6		115
Cheese and Butter Sales		20 18 8		28
Special Prizes		10 0 0		
Fines		1 0 0		
			107 17 2	143
WORKING DAIRY:—				
Admissions		26 8 0		4
Entry Fees, Competitions		25 14 6		26
Ditto Dairy Appliances		31 8 10		7
Ditto Butter Test Prizes		34 13 0		33
			91 16 4	67
Premium on Produce Sales, &c.		10 10 0		31
			123 14 4	103
Carried forward		..	4,871 6 9	

CASH ACCOUNT—continued.

CR.

PAYMENTS.	1898.		1897.	
	CARDIFF.		SOUTHAMPTON.	
Brought forward . . .	£	s. d.	£	s. d.
	5,995	7 0		
ARTS:—				
Labour and Fittings	54	4 0	57	0 0
Steward and Assistants	47	12 10	35	2 8
Hanging and re-packing Pictures	43	14 6	41	18 6
Local Agents and Carriage	61	6 3	63	17 1
Printing and Stationery, Insurance, &c.	11	12 3	9	2 9
	218	9 10	207	1 0
ART UNION:—				
Pictures Purchased	160	12 10	161	9 3
Printing and Stationery	6	3 9	5	16 6
Advertising	2	2 0	2	2 0
Commission on Sale of Tickets	5	2 9	4	16 0
	174	1 4	174	3 9
ART-MANUFACTURES:—				
Labour and Fittings	56	17 0	60	10 7
Steward and Assistants	5	3 0	6	10 0
Printing	4	16 0	3	16 0
	66	16 0	70	16 7
MUSIC:—				
Bands and their Fares	254	11 8	200	11 0
Erecting Band Stands and Seats and Printing	22	1 6	19	12 0
Steward	8	10 0	2	0 0
	285	3 2	222	3 0
HORTICULTURE:—				
Gratuities to Gardeners	100	0 0	80	0 0
Erecting and Repairing Tent and Staging	54	17 0	60	0 0
Steward and Assistants	14	10 2	19	6 8
	169	7 2	159	6 8
CHEESE AND BUTTER:—				
Judges	7	1 6	11	0 6
Prizes	171	0 0	237	0 0
Stewards and Assistants	12	17 5	18	19 3
Shedding	174	0 0	106	18 9
Printing, Stationery, Carriage, &c.	4	3 2	6	1 7
Grass Table for Butter	5	0 0	5	0 0
	274	2 1	379	0 1
WORKING DAIRY:—				
Stewards and Assistants	57	11 2	72	5 8
Judges and Demonstrators	58	6 0	52	3 4
Building	183	16 0	237	4 9
Printing, Stationery, Postage, and Insurance	7	0 9	9	7 9
Utensils, Carriage, &c.	37	8 9	19	1 7
Prizes	53	9 2	57	0 2
Coal, Salt, Ice, &c.	4	8 8	8	1 5
Consulting Chemist and Analysts	7	3 3	..	
	409	3 9	455	4 8
Carried forward	2	7,592 10 4		

DR. CASH ACCOUNT—continued.

RECEIPTS.	1898. CARDIFF.						1897 SOUTHERN
	£	s.	d.	£	s.	d.	£
Brought forward . . . . .	..			4,671	6	9	4
SHEARING . . . . .	..			..			5
CIDER:—							
Entry Fees . . . . .	..			9	5	0	9
ADMISSIONS TO SHOW-YARD:—							
Admissions at 2s. 6d.	1,534	0	6				964
Ditto at 1s.	1,962	5	0				1,511
Children at 1s.	30	3	0				28
Ditto at 6d.	81	0	0				84
Season Tickets	84	7	6				43
				3,691	15	6	2,622
SHOW REFRESHMENT CONTRACTS:—							
Sale Premiums and Fittings . . . . .	..			479	13	9	52
SHOW RECEIPTS (UNAPPORTIONABLE):—							
Stand-fittings	151	17	4				18
Cloak Room, Parcels Office, Chairs, Cycle Rest, Photographs, &c.	43	19	6				4
				195	16	10	22
SUBSCRIPTIONS FROM TOWNS:—							
Exeter, for 1899 Show. . . . .	..			800	0	0	84
Carried forward				2,10,047	17	10	

CASH ACCOUNT—continued.**CR.**

PAYMENTS.	1898. CARDIFF.			1897. SOUTHAMPT'N.		
	£	s.	d.	£	s.	d.
Brought forward . . . . .	..		7,592 10 4			
SHEARING . . . . .	..		..		37	7 6
CIDER:—						
Shedding and Fittings.	28	0	0		29	4 0
Steward and Assistants	5	3	1		9	15 8
Judge	5	16	0		7	0 0
Prizes	8	19	8		8	12 1
Printing, &c.	4	10	2		2	16 0
Analyses	11	0	0		11	0 0
			63 8 11		68	7 9
BEES . . . . .	..		..		10	0 0
PUBLIC ANNOUNCEMENTS:—						
Advertising	181	3	8		181	6 3
Billposting	94	14	2		115	17 7
Railway Placards	47	13	0		37	7 8
Printing	75	1	0		77	12 7
Rent of Placard-Frame Stores	4	0	0		4	0 0
			402 11 10		416	4 1
SHOW REFRESHMENT CONTRACTS:—						
Shedding	210	14	9		231	10 6
Printing, &c.	2	1	8		3	17 6
			212 16 5		235	8 0
SHOW EXPENSES (UNAPPORTIONABLE):—						
Erecting Offices and other Buildings	710	11	2		879	3 1
Ditto Hoarding	47	6	8		198	11 8
Carriage of Plant	127	5	2		135	1 4
Steward of Works	11	3	6		12	4 6
Stand Fittings	61	16	2		64	7 0
Extension of Telegraph Wires	6	12	11		8	17 5
Insurance of Plant	4	10	0		4	10 0
Hire of Furniture	12	7	0		13	19 6
Mess Room, &c.	5	5	0		6	8 3
Gatekeepers, Yardmen, Messengers, &c.	68	6	2		81	15 8
Stewards of Finance and Treasurer	26	8	6		23	2 0
Finance Office and Treasurer's Clerks	38	1	8		40	1 0
Police	96	7	6		106	15 0
Badges, &c.	3	5	0		3	16 7
Catalogues for Press and Officials	5	12	0		6	8 0
Purchase of Plant	9	0	1		55	14 2
Printing and Stationery	37	9	8		32	5 2
Commission on Sale of Season Tickets	3	0	10		1	1 9
Cartage and Sundries	4	8	7		6	2 0
Luncheons to Local Committee	10	17	8		..	
Southampton Jubilee Fund.		50	0 0
			1,289 15 3		1,730	4 1
Carried forward	£	9,561 2 9			

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CASH ACCOUNT—continued.

RECEIPTS.	1898.		189
	CARDIFF.		SOUTH
	£	s. d.	£
Brought forward	10,047 17 10	
SCHOOLS:—			
SOMERSET FARRIERY:—	£	s. d.	
Students' Fees	7	17 6	8
Grant from County Council	300	0 0	268
	307	17 6	277
SOMERSET CHEESE:—			
Students' Fees	122	9 6	1
Cheese and Butter sold	478	1 6	34
Ditto (1897 draft)	70	0 0	
Sale of Students' Note-Books	2	9 0	
Sale of Cheese-making Apparatus . . . .	..	
	673	0 0	41
Grant from County Council	250	0 0	
Ditto Ditto (1897 school) 100 0 0	100	0 0	1
	350	0 0	
DEVON BUTTER:—			
Final Balance from County Council	27	10 11	33
DORSET CHEESE . . . .	..	..	44
	1,350	8 5	1,324
Carried forward . . . .	..	£11,406 6 3	

CASH ACCOUNT—continued.

CR.

PAYMENTS.	1898. CARDIFF.		1897. SOUTHAMPTON.	
	£	s. d.	£	s. d.
Brought forward. . . . .	..	9,561 2 9		
FARRIERY:—				
tor	135	5 5	142	10 9
ary Surgeon.	31	10 0	31	10 0
on, &c.	19	10 7	16	1 0
e and Cartage	17	8 6	27	4 3
Yards and hire of Horses	17	17 0	14	7 0
nd Judges at Competition	21	19 10	14	14 3
g, Stationery, Postage, and } and Travelling Expenses }	73	7 5	58	18 3
Repairs, and Fittings	14	15 6	2	0 6
	331	14 3	307	6 0
CHEESE:—				
and Expenses	135	10 0	130	6 0
's Time and Expenses	58	13 4	43	13 6
or's Expenses	15	0 0	15	0 0
Wages	50	8 4	51	2 7
taff and Travelling	29	10 6	15	12 3
.	500	0 0	542	1 6
, Bandages, Coal, Salt, &c.	11	18 3	14	11 11
c of Plant	3	13 10	3	8 7
g, Stationery, Advertising, } ges and Telegrams }	15	8 1	9	16 7
's Board	85	10 0	70	4 0
ing and replacing Plant and } ngs }	27	1 1	49	6 5
nd Labour	26	11 3	..	
	959	4 8	945	3 4
UTTER . . . . .	..	..	575	13 9
CHEESE . . . . .	..	..	105	6 2
	1,290	18 11	1,933	9 3
Carried forward	210,852	1 8		

CARDIFF MEETING, 1898. (cxxvi)

Dr.

CASH ACCOUNT—continued.

RECEIPTS.			1896. CARDIFF.		1897 SOUTHEAST
	£	s. d.	£	s. d.	£ s
Brought forward . . . . .	..		11,406	6 3	
EXPERIMENTS:—					
Field:—					
Sale of Hay . . . . .	..		..		6
FIELD, CHEESE, AND CIDER:—					
Government Grant	300	0 0			300
				300 0 0	306
Sale of India Stock (£1,847 4s. 7d.) . . . . .	..		..		1,000
			11,706	6 3	12,416
Balance in Bank, Jan. 1 . . . . .	..		120	12 1	420
			£ 11,826	18 4	12,838

CASH ACCOUNT—continued.**CR.**

P A Y M E N T S.	1898. CARDIFF.			1897. SOUTHAMPTON.		
	£	s.	d.	£	s.	d.
Brought forward . . . . .	..	10,852	1 8			
EXPERIMENTS:—						
FIELD:—						
Manures, Seeds, and Cattle Food		2	17 3		23	3 4
Printing and Stationery		28	16 2		22	2 0
Stewards' Time, Travelling, Post- age, &c.		22	0 1		34	0 1
Secretary, Office, and Travelling		25	9 1		23	6 8
Consulting Chemist		8	11 8		9	12 9
Botanical Visitor		18	6 7		29	8 1
Rent of Fields . . . . .		..			14	0 0
Bacteriologist and Veterinary Sur- geon . . . . .		..			39	18 0
Labour, Cattle, and Occupier's Ex- penses . . . . .		..			18	7 0
	106	0	10	213	17	11
CIDER:—						
Expert		80	0 0		80	0 0
Fittings		19	6 6		16	0 0
Office and Travelling		9	6 8		9	6 8
Printing and Drawings		17	7 0		26	13 6
	126	0	2	132	0	2
CHEESE:—						
Expert and Assistant		278	1 0		278	4 0
Board and Lodgings for same and Carriage		28	10 6		19	6 0
Ditto Ditto (1896) . . . . .		..			11	5 0
Printing and Publishing		30	1 6		34	19 5
Secretary and Office		27	6 8		27	6 8
Fittings		4	19 9		..	
	368	19	5	371	1	1
				601	0	5
				11,453	2	1
Balance in Bank, Dec. 31 . . . . .	..	373	16 3	12,718	4	3
				£ 11,826	18	4
				12,838	16	4

hereby certify that I have examined the foregoing accounts for the year ending Dec. 31st, 1898, and the payments entered with the vouchers, and found them all in order and correct.

an. 18th, 1899.

ALBERT GOODMAN, F.C.A.,

Auditor.

Passed by Council,
Jan. 31st, 1899.

THOS. F. FLOWMAN,

Secretary.

Bath and West and Southern Counties Society,

FOR THE

Encouragement of Agriculture, Arts, Manufactures, and Commerce.

List of Members.

CORRECTED TO JANUARY 31ST, 1899, INCLUSIVE.

PATRON.

HIS ROYAL HIGHNESS THE PRINCE OF WALES, K.G.

PRESIDENT

FOR 1898-99.

THE RIGHT HON. THE LORD CLINTON.

TRUSTEES.

SIR J. F. LENNARD, BART.

RIGHT HON. SIR R. H. PAGET, BART.

RIGHT HON. THE LORD CLINTON.

Names thus () distinguished are Governors.*

Names thus (†) distinguished are Life Members.

**** Members are particularly requested to make the Secretary acquainted with any errors in the names or residences.*

Name.	Residence.	Sub- scriptions.
† WALES, HIS ROYAL HIGHNESS THE PRINCE OF, K.G.	Sandringham, Norfolk	£ s. d. ..
† York, H.R.H. The Duke of, K.G.	York Cottage, Sandringham . . . . .	..
Abbot, G.	The Priory, Abbots Leigh, Bristol	1 0 0
† Ackers, B. St. John	Huntley Manor, Huntley, near Gloucester . . . . .	..
Acland, Sir H. W., Bart., K.C.B., M.D., &c.	Broad Street, Oxford	1 0 0
Acland, Alfred Dyke	38, Pont Street, Belgrave Square, London, S.W.	1 0 0
* Acland, Sir Charles T. D., Bart.	Holnicote, Taunton	2 0 0
† Acland, Rt. Hon. A. H. Dyke, M.P.	28, Cheyne Walk, London, S.W.	..
Adams, E.	Horner Farm, West Luccombe, Minehead	0 10 0

(9)

VOL. IX.—F. S.

Name.	Residence.	Sub- scriptions.		
		£	s.	d.
Adams, George	Royal Prize Farm, Pidnell, Faring- don, Berks	1	0	0
Adams, S. W., jun.	7, Boringdon Villas, Plympton St. Mary	1	1	0
*Addington, Lord	Addington House, Winslow, Bucks.	2	2	0
Affleck, F. and T.	Swindon	1	0	0
†Agate, Alfred	Broomhall, Horsham . . . . .	..	..	..
Aiken, J. C.	The Glen, Stoke Bishop, Bristol .	1	0	0
†Aitken, G. H.	Warminster . . . . .	..	..	..
Alexander, D. T.	Cardiff	1	1	0
†Allen, Col. R. E.	Assist. Adj.-Gen.; Curragh Camp, Kildare, Ireland . . . . .	..	..	..
†Allen, James D.	Springfield House, Shepton Mallet	..	..	..
*Allen, J.	Park Place, Cardiff	2	0	0
Allen, W. T.	West Bradley, Glastonbury . . .	1	0	0
Allmand, F.	Victoria Flour Mills, Wrexham .	1	0	0
*†Amherst, Earl.	Montreal, Sevenoaks . . . . .	..	..	..
Anglo-Bavarian Brewery Co. Anglo-Swiss Condensed Milk Co.	Shepton Mallet Chippenham	1	0	0
Archer, C.	Trelaske, near Launceston . . .	1	0	0
†Arkwright, J. H.	Hampton Court, Leominster . .	..	..	..
Armitage, S. H.	Upper Newton, Kinnersley, Hereford	1	0	0
Armstrong, J. D.	Vallis Farm, Frome	1	0	0
Ashburton, Lord	The Grange, Alresford, Hants .	1	0	0
†Ashcombe, Lord	7, Prince's Gate, London, S.W.	..	..	..
Ashcroft, W.	13, The Waldrons, Croydon . . .	1	0	0
Ashford, E. C., M.D.	The Moorlands, Bath	1	0	0
Aubrey, T., F.R.C.V.S.	19, Paragon, Bath	1	0	0
†Aveling, Thomas L.	Rochester . . . . .	..	..	..
Avon Manure Co.	St. Philip's Marsh, Bristol . . .	1	0	0
Awdry, P. D.	Chippenham	1	0	0
Ayshford-Wise, Major Lovat .	Watts House, Bishop's Lydeard .	1	1	0
Baber, S.	Elborough Farm, Locking, Weston-super-Mare	1	0	0
Badcock, H. Jeffries.	Taunton	1	0	0
Badcock, W. L.	Pitminster Lodge, Taunton . . .	1	0	0
Bailey, H.	St. Stephens, St. Albans	1	0	0
Bailey, J.	Nynehead, Wellington, Somerset	1	0	0
†Baillie, Evan	Filleigh, Chudleigh . . . . .	..	..	..
Bailward, F. H. M.	Horsington, Wincanton	1	1	0
†Bainbridge, Captain J. H. .	Gnaton Hall, Yealmpton, Ply- mouth . . . . .	..	..	..
Baker, F.	Manor Farm, Frindsbury, Ro- chester	1	0	0

Name.	Residence.	Subscriptions.		
		£	s.	d.
L. Lloyd	Hardwicke Court, nr. Gloucester.	1	0	0
J.	Ottershaw Park, Chertsey, Surrey	.	.	.
bert N. G.	Heavitree, Exeter . . . . .	.	.	.
H.	More Down, Mere	0	10	0
liam	Eastbury, Epsom Road, Guildford	1	0	0
Proctor	Sandhill Park, Taunton	1	0	0
iel	Westacott Nursery, Barnstaple .	1	0	0
ptain K. R.	Branksea Island, Poole	1	0	0
N. E.	Barvin, Potters Bar, Herts. . .	2	0	0
L. and Sons	Uttoxeter	1	0	0
. C.	Thirsk, Yorkshire	1	0	0
l Perkins.	Peterborough	1	0	0
. T.	College Farm, Finchley	1	0	0
n. A. H.	The Grange, Alresford, Hants .	1	0	0
A.	Solesbridge, Chorleywood, Herts.	1	0	0
ajor William	Moredon, North Curry, Taunton	1	0	0
s. W.	Taplow House, Bucks	1	0	0
J. J.	The Lodge, Weston-super-Mare .	1	1	0
sir Walter, Bart. . .	Coates, Pulborough, Sussex . .	1	1	0
. H.	Pilton House, Barnstaple . . .	.	.	.
3. J. P.	Kitley, Yealmpton, Ivybridge .	2	0	0
F. J.	The Reddings, Moor Green, Bir- mingham	1	0	0
arquess of	Longleat, Warminster . . . . .	.	.	.
Wells, The Bishop of	The Palace, Wells	1	1	0
Co.	Bath	1	0	0
J., jun.	Lydney Park, Glos.	1	0	0
Earl	Cirencester House, Cirencester .	2	2	0
.	Westown, Bristol	1	0	0
l. Mount. . . . .	. . . . .	1	0	0
oll, R. H.	Road Manor, Bath	1	0	0
. W. J.	St. Loyes, Exeter . . . . .	.	.	.
Edward	Broadway, Dorchester	1	0	0
F. H.	Hailwell Farm, Framfield, Sussex	1	0	0
.	Torr Grove, Plymouth . . . . .	.	.	.
3, E. B.	Trevince, Scorrier, Truro . . .	1	0	0
Duke of, K.G. . . .	Badminton, Glos.	2	2	0
l. H., M.P.	Coombe Priory, Shaftesbury . .	1	0	0
. E.	Éthorpe, Gerrard's Cross, Bucks.	1	1	0
nford, J.	Pyt House, Tisbury	1	1	0
others	Journal Office, Salisbury	1	1	0
.	Kingston Fields, Derby	1	0	0
ward H., and Co. . .	Heybridge, Maldon, Essex . . .	1	0	0
I. Herbert	Englefield House, Reading . . .	5	0	0
ord	18, Moore Street, Cadogan Square, London . . . . .	.	.	.
H. W.	Rosclands, Woolston, Southamp- ton	1	0	0
.	Abbot's Ann, Andover	1	0	0
st. John C. (R.N.). .	Plas-yn-Vivod, Llangollen . . .	.	.	.
George	Charlton House, Ludwell, Salis- bury . . . . .	.	.	.

Name.	Residence.	Subscriptions.		
		£	s.	d.
Best, Major M. G.	Park House, Boxley, Maidstone.	1	0	0
Best, Captain T. G.	Abbot's Ann, Andover	1	0	0
†Best, Lieut. W.	The Barracks, Wrexham			
Beviss, W. Salter	Linnington, Wambrook, Chard .	1	0	0
Bigg, Thomas	Leicester House, Great Dover Street, London, E.C.	0	10	0
Birmingham, C.	Holnicote, near Minehead	0	10	0
Biscoe, H. S. T.	Holton Park, near Oxford	1	0	0
Blackstone and Co. (Limited)	Rutland Iron Works, Stamford, Lincoln	1	1	0
Blake, Abel	Loxbeare, Tiverton	0	10	0
Blake, William	Bridge House, Ilminster, South Petherton	1	0	0
Blundell, R. C.	Benhams, Horley, Surrey	1	1	0
Blyth, Sir J., Bart.	33, Portland Place, London, W. .	1	0	0
Board, J.	Hill Farm, East Pennard, Shepton Mallet	1	0	0
Boby, Robert	Bury St. Edmunds, Suffolk . . .	1	0	0
Bolden, Rev. C.	Preston Bissett, Buckingham . .	1	0	0
Bolitho, T. B., M.P.	Treridden, Penzance	1	0	0
Bond, E.	Hele, Cullompton	1	0	0
†Bond, N.	Creech Grange, Wareham, Dorset .			
Boscawen, Rev. A. F.	Ludgvan Rectory, Long Roch, Cornwall, R.S.O.	1	0	0
*Boteler, Capt. W. J. Cas- berd	The Elms, Taplow	2	0	0
†Boughton-Knight, A. R. . . .	Downton Castle, Ludlow			
Bound, William	Hurstborne Tarrant, Andover. .	1	1	0
Bourne, C. H.	Stanmore Road, Edgbaston, Birmingham	1	1	0
Bouverie, Hon. D. P.	Coleshill House, Highworth . . .	1	1	0
Bouverie, H. P.	Brymore, Bridgwater	1	0	0
†Bowen-Jones, J.	Eusdon House, Montford Bridge. .			
†Bowerman, Alfred	Capton, Williton			
Bowerman, F.	Knott Oak House, Ilminster . . .	1	0	0
Boyle, M.	Timsbury, Bath	1	0	0
Braby, E. E.	Drungewick Manor House, Horsham, Sussex	1	0	0
Brailburne, H.	Lyburn, Lyndhurst, Hants . . .	1	0	0
Bradford, Thos., and Co. . . .	Salford, Manchester	1	0	0
Bradley, W. McK.	Leylands, Meopham, Kent	1	1	0
†Brakenridge, John Herman.	The Rookery, Chew Magna, Bristol			
Brakenridge, W. J.	Newton House, Clevedon, Somerset	1	1	0
Brain, S. A.	Old Brewery, Cardiff	1	0	0
†Brassey, A., M.P.	Heythrop, Chipping Norton, Oxon .			
*†Brassey, H. L. C.	Preston Hall, Aylesford, Kent . .			
Brendon, G.	Broomhill, Stratton, North Devon	1	0	0
Brenton, W., and Co.	Polbathic, St. Germans	1	0	0
Bristol Wagon Works Com- pany (Limited)	Lawrence Hill, Bristol	1	1	0
Britter, Admiral R. F.	Kenwick, Worcester.	1	0	0

Name.	Residence.	Subscriptions.
		£ s. d.
ead, W. B.	Enmore Park, Bridgwater	1 0 0
n, F. D.	Beach Borough, Hythe, Kent. . .	1 0 0
, E.	Cossington, Somerset	1 0 0
A.	Hill Farm Dairy, Southampton . .	1 1 0
f.	Marden Farm, Hertford	1 0 0
William Jeffery . . .	Middlehill House, Box, Wilts . .	1 0 0
t. G. Prideaux . . .	Prideaux Castle, Padstow	1 0 0
J.	7, Princes Street, Yeovil	1 0 0
J. P.	58, Princes Gate, London, S.W. . .	1 0 0
, William E., M.P. . .	Ilslington House, Dorchester . . .	1 0 0
gham, Rev. F. F. . .	The Rectory, Doddiscombsleigh, Exeter	1 0 0
, W. J.	Llanelly	1 0 0
, B.	Holcombe Rogus, Wellington, Somerset	1 0 0
. C.	Land Surveyor, Shepton Mallet . .	1 0 0
Admiral A.	Erle Hall, Plympton	1 0 0
oe, E. A.	Coombe Florey, Taunton	1 0 0
, W.	Chippenham	1 0 0
re, Lord.	Cattedown, Plymouth	1 0 0
J.	Island House, Highbridge	1 0 0
C., and Sons	St. Nicholas Works, Thetford . . .	1 0 0
Sir C. R., Bart. . . .	Knepp Castle, Sussex	1 0 0
rs. L. E.	Ellaston, Atlantic Road South, Weston-super-Mare	1 1 0
.	Torquay	1 0 0
C. and W.	Bath	1 0 0
Gr., and Co.	Percy House, Kensington, Bath . .	1 0 0
orth, R. W.		
Col. A. M.	Ockley Court, Dorking	1 0 0
, C. Lee	Glewstone Court, Ross	1 0 0
W. H.	Danney, Hassocks, Sussex	1 0 0
. C.	Woolcombe, Cattistock, Dorset . .	1 0 0
H.	Milton Clevedon, Evercreech . . .	1 0 0

Name.	Residence.	Subscriptions.
Carew, C.	Collipriest, Tiverton.	£ s. d. 1 0 0
†Carey, P. W.	Cardiff . . . . .	..
Carnarvon, Earl of	Highclere Castle, Newbury	1 1 0
Carr, L.	Court-y-bel, Penarth, Glam.	1 0 0
Carr, R.	Estate Office, Tring Park, Herts.	1 0 0
†Carter, E.	Puckpool House, Ryde, Isle of Wight . . . . .	..
Carter, J., and Co.	238, High Holborn, London	1 0 0
†Cartwright, F. F.	7, Percival Road, Clifton . . . . .	..
Carver, H. R.	West House, Chilton Polden, Bridgwater	1 0 0
Cary, Edmund	Pylle, Shepton Mallet	0 10 0
†Cary, W. H.	Steeple Ashton, Trowbridge . . . . .	..
Cater, R. B.	Bath	1 1 0
†Catt, C. W.	52, Middle Street, Brighton (Hon. Local Sec., 1885) . . . . .	..
Cecil, Lord A.	Orchardmains, Tunbridge	1 0 0
Cecil, Lord L.	Orchardmains, Tunbridge	1 0 0
Chadwyck-Healey, C. E. II.	New Place, Porlock, Somerset	1 0 0
*Chaloner, Capt. R. G. W., M.P.	Melksham House, Melksham, Wilts	2 0 0
Champion, F.	West Pennard, Glastonbury	1 0 0
†Chapman, C.	Carlecotes Hall, Dunford Bridge, near Sheffield . . . . .	..
Chapman, Rev. H.	Donhead St. Andrew, Salisbury	1 0 0
Chapman, W. W.	Fitzalen House, Arundel Street, Strand, London	1 0 0
Cheetham, F. H.	Tetton House, Kingston, Taunton	1 1 0
Chick, John	Compton Valence, Dorchester	1 1 0
Chorley, W. L.	Quarme, Dunster, Somerset	1 0 0
Churchouse, A.	Perridge House, near Shepton Mallet	1 0 0
*Clarendon, Earl of	The Grove, Watford.	2 2 0
Clark, Isaac	West Lynch, Selworthy	1 0 0
Clark, James	Street, Glastonbury	1 0 0
†Clark, J. J.	Goldstone Farm, West Brighton (Hon. Local Sec., 1885) . . . . .	..
Clark, W. S.	Street, Glastonbury	1 0 0
Clarke, A. J.	100, New Bond Street, London	1 1 0
Clarke, Captain J. S.	Langley Lodge, Chippenham	1 0 0
Clarke, Joshua	Minehead	1 0 0
†Clarke, Capt. T. E.	Alcombe, Cote, Dunster . . . . .	..
Clarke, W.	East Lynch, near Minehead, Somerset	1 0 0
Clarke, W. Hurle	Manor Cottage, Wanstrow, Somerset	1 1 0
Clayden, H.	Northoe, Park View, Hoddesdon	1 1 0
*Clayton, Shuttleworth, and Co.	Lincoln	2 2 0
Cleall, S.	Berwick, Bridport	1 0 0
Cleave, W. C.	Sanctuary, Crediton, Devon	1 1 0
Cleaver, Capt. J. H.	Cannon Street Hotel, London, E.C.	1 0 0

Subscriptions.

CXXXV

Name.	Residence.	Subscriptions.		
		£	s.	d.
Edmund H.	Burford, Shepton Mallet	1	0	0
Col. R. M.	Charlton House, Shepton Mallet.	1	0	0
Lord	Ugbrook, Chudleigh			
Lord	Heanton Satchville, Dolton, North Devon	2	2	0
Robert Geo.	Brome House, West Malling, Kent	1	0	0
R. W.	9, Whitehall Place, London	0	10	0
S. B.	Doner's Lodge, Reigate	1	0	0
M.	Stanton Drew Court, Pensford	1	0	0
and Sons	Higham, Kent	1	0	0
	Frome Selwood	0	10	0
	Manor House, Winterbourne Stoke, Salisbury	1	0	0
W.	Westmead, Bridport	1	0	0
ourne, J. S.	Aston Ingham, near Ross	1	0	0
C.	Longhouse Farm, Oldford, Frome	1	0	0
C. R.	Hartwell House, Exeter	1	1	0
D.	Newton Ferrars, Carrington, Cornwall	1	0	0
g, E., M.P.	Roundway Park, Devizes	2	2	0
st, Symons, and Co. (ted)	Bridgwater	1	0	0
, R. H.	Pierrepont, Farnham	2	0	0
Herbert F.	The Poplars, Pucklechurch, Bristol	1	0	0
	Chevithorne Barton, Tiverton	1	1	0
J. W. Radcliffe, M.P.	Helens, Herefordshire, <i>via</i> Dymock, Glos.	1	0	0
n, H. T.	Sturford Mead, Warminster			
G., and Son	Northgate Street, Bath	1	1	0
Joseph	Radstock, Bath	1	0	0
G. H.	Huntspill, Bridgwater	1	1	0
, P. W. D.	99, Pembroke Road, Clifton			
, R. P.	Shenstone Court, Lichfield			
J. R.	More Place, Betchworth, Surrey.	1	0	0
Thomas.	Perseverance Iron Works, Shrewsbury	1	0	0
, W.	36, Southwark Street, London	1	0	0
ad Orrery, The Earl of	Marston, near Frome	2	2	0
, H. W.	Manor House, Inglescombe, Bath			
W. J.	Abbey Churchyard, Bath	1	0	0
illis, F. S. W.	Linton Park, Maidstone			
J.	Llantarnum Abbey, Mon.	1	0	0
H. B.	Druidstone, Castleton, Cardiff	2	0	0
	3, Elliott Terrace, Plymouth	1	0	0
Col., the Hon. R. S.	Somerford Hall, Brewood, Staffs.	1	0	0
, G.	Cottrell & Co., Hungerford	1	0	0
J. P.	Perseverance Works, Grantham	1	0	0
l, J. E.	Wedmore, Weston-super-Mare	1	0	0
ay, Hon. H. L.	Fox, Fowler's Bank, Exeter	1	0	0
naker, Lieut.-Col. G.	Westwood, Guildford, Surrey			
ry, The Earl of	Croome Court, Severn Stoke, Worcestershire	2	2	

Name.	Residence.	Sub- scriptions.
		£ s. d.
Cowles, W. J.	Barnet, Herts.	1 0 0
Cox, B.	Pwllpen Farm, Christchurch, Newport, Mon.	0 10 0
Cox, James	Rosewell Farm, High Littleton, Bristol	1 0 0
Craddock, G.	Messrs. G. Craddock & Co., Wake- field	1 0 0
Craig, W.	Winford Tower, Beaworthy, R.S.O., Devon	0 10 0
Crawshay, W. T.	Caversham Park, Reading	1 0 0
Crick, Thomas	Great Ash, Winsford, Dulverton	0 10 0
Crocker, F. W.	Tedford Farm, Batcombe, Cattis- tock, Dorset.	1 0 0
Crofts, D. J.	Sutton Montis, Sparkford, Bath	1 0 0
Crookshank, Prof. E. M.	King's College, London.	1 0 0
Crowley, J., and Co.	Meadow Hall Iron Works, Shef- field	1 0 0
Crutchley, P. E.	Limminghill Lodge, Ascot	1 0 0
Culverwell, E. T.	Durleigh Farm, Bridgwater	1 0 0
Cuming, A. P.	Moreton Hampstead, Devon	1 0 0
Cundall, H. M., F.S.A.	Richmond, Surrey	1 0 0
Custance, Mrs. M.	Woodlands, Southwater, Horsham	1 0 0
Cutcliffe, G.	Coombe House, Witheridge, N. Devon	1 1 0
Dairy Outfit Company (Ld.).	King's Cross, London	1 0 0
Dairy Supply Company (Ld.).	Museum St., Bloomsbury, London	1 0 0
Damerel and Son.	161, Sidwell St., Exeter	1 0 0
Dames, C. R.	Hill Stud Farm, Winchester	1 0 0
Dampney, G. D.	Hinton, Ilchester.	1 0 0
Danger, Thomas	Rowford Lodge, Taunton	1 0 0
Daniel, Rev. H. A.	Manor House, Stockland, Bridg- water	1 0 0
†Daniel, H. T.	Manor House, Stockland, Bridg- water . . . . .	. . .
Daniel, Thos. C.	73, Elm Park Gardens, London, S.W.	1 1 0
Darby, A. E. W.	Little Ness, Shrewsbury	1 0 0
Darby, E.	Liscombe, Dulverton	1 0 0
Darby, S. R.	Merafield, Martock, R.S.O.	1 0 0
†Davenport, Rev. George	Foxley, Hereford . . . . .	. . .
†Davey, J. Sydney	Brockym House, Helston, Cornwall . . . . .	. . .
Davey, Sleep, and Co.	Excelsior Plough Works, Ply- mouth	1 1 0

Name.	Residence.	Subscriptions.		
		£	s.	d.
, T.	Beere Manor, Cannington, Bridgewater.	1	1	0
s, J. N.	Gweleath, Cury, R.S.O., Cornwall	1	0	0
, F. L.	7, Bute Crescent, Cardiff	1	1	0
, H. J.	Tivoli, Newport, Mon.	1	0	0
, H. J.	Doultling, near Shepton Mallet . .	1	0	0
y, W.	Tracy Park, Bristol . . . . .	..	
G.	Larkbere Farm, Ottery St. Mary, Devon	1	0	0
, R. R. M.	Spurbarne, Exeter	1	0	0
on, Hon. R.	Holne Park, Ashburton.	1	0	0
on, W. and F.	Market Place, Bath.	1	1	0
and Sons	Crewe	1	0	0
John.	Huxham, E. Pennard, Shepton Mallet	1	0	0
, Son, and Hewitt	22, Dorset St., Baker St., London	..		
on, W. A.	20, Birchin Lane, London, E.C..	..		
S.	Newport, Mon.	1	0	0
aquiere, Lord	3, The Circus, Bath	1	0	0
roke, Lord Willoughby	Compton Verney, Warwick . . . .	..	
otto, Col.	Brook Lodge, Holm Wood, Dorking, Surrey	1	0	0
ex, Rev. A. F.	Mushaw Rectory, S. Molton	1	0	0
Warr, Countess	Buckhurst, Withyham, Sussex . .	1	1	0
ornay, A.	Col d'Arbres, Wallingford	1	0	0
urrieta, A.	Wadhurst Park, Hawkhurst, Sussex . . . . .	..	
r, Rev. Samuel	Lattiford House, Wincanton	1	0	0
g, C., and Co.	Chard, Somerset	1	0	0
y, The Earl of	Knowsley, Prescott . . . . .	..	
itre, H. Denis	Charlton House, Wantage . . . . .	..	
nshire, Duke of, K.G.	Chatsworth, Derbyshire	5	0	0
on's, Limited	Chester	1	1	0
y, Lord	Minterne, Cerne Abbas . . . . .	..	
, J. K.	Sherborne Castle, Sherborne	1	0	0
, J. K. W., M.P.	Sherborne Castle, Sherborne	1	0	0
G. D., jun.	Manor Farm, Bathford, Bath. . . .	1	0	0
on, W. V.	Perridge House, Shepton Mallet. . .	..	
gton, R. M.	Horsington House, Templecombe . .	1	1	0
ng, F. H.	Hedge Farm, Pylle, Shepton Mallet	1	0	0
, T. C.	Elm Grove, Dawlish	1	0	0
e, James	Melrose, Glastonbury	1	0	0
e, A. F. Milton	Bladon, Woodstock . . . . .	..	
mond, H. W.	Syon House, Budleigh	1	0	0
e, Earl of	Tortworth Court, Falfield, R.S.O., Glos.	2	0	0
ham, T.	Halmer, Hereford . . . . .	..	
worth, Rev. W. A.	Orchardleigh Park, Frome.	2	0	0
orth-King, Sir D., Bart.	Wear House, near Exeter	1	0	0
le, Major A. G.	Stock House, Sturminster Newton . .	1	0	0
oyne, Lord	Greendale, Clyst St. Mary, Exeter . .	..	

Name.	Residence.	Sub- scriptions.
		£ s. d.
†Dungarvan, Viscount . . .	40, Charles Street, London, W. . .	..
Dunn, William	Frome	1 1 0
Dunning, E. H.	Stoodleigh Court, Stoodleigh, N. Devon	1 0 0
*Dunraven, Earl of	27, Norfolk Street, Park Lane, London, W.	2 2 0
†Durrant, Edward	Tunbridge Wells (Hon. Local Sec. 1881) . . . . .	..
Dyke, Thomas	Long Ashton Lodge, Clifton, near Bristol	1 0 0
*Dyke, Rt. Hon. Sir W. Hart, Bart., M.P.	Lullingstone Castle, Eynsford. . .	2 2 0
†Dymond, Edward E.	Oaklands, Aspley Green, Bletch- ley . . . . .	..
Dymond, Francis W.	Bampfylde House, Exeter	1 0 0
Eagle Range and Foundry Co. (Limited)	Catherine Street, Aston, Birming- ham	1 0 0
Easton and Bessemer (Ld.) . .	Taunton.	1 0 0
Easton, Richard	Heale Mount, Taunton.	1 0 0
Eddy, J.	Kennsford Ironworks, Exeter . .	1 0 0
Edgar, Frank	Polden Hill Dairy, Chilton Polden, Bridgwater	1 0 0
†Edgcumbe, Sir E. Robt. P. .	Sandyc Place, Sandy . . . . .	..
†Edmondson, A.	Tubney Warren Farm, Abingdon .	..
Edwards, C. L. Fry	The Court, Axbridge, Somerset . .	1 0 0
Edwards, A. P.	Hutton, Weston-super-Mare . . .	1 0 0
Edwards, Jas.	Belmont, Flax Bourton, near Bristol	1 0 0
Edwards, Jas.	Brynhyfryd, Bwlch, Breconshire .	1 0 0
Edwards, W. H. G.	Butcombe Court, Wrington . . .	1 0 0
†Egmont, Earl of	Cowdray Park, Midhurst, Sussex .	..
Eldridge, Pope, and Co. . . .	Dorchester	1 0 0
*Elliot, H. E. Tracey	Leigham House, Plympton	2 2 0
Ellis, J.	Maidstone	1 0 0
*Elton, Sir E., Bart.	Firwood, Clevedon	2 2 0
Elworthy, C.	Stone Farm, South Molton	0 10 0
Enys, F. G.	Enys, Penryn, Cornwall	1 0 0
Esdaile, C. E. T.	Cothelstone House, Taunton . . .	1 0 0
Evans, Daniel	Winsford, Dulverton	0 10 0
†Evans, Sir David, K.C.M.G. (31)	Ewell Grove, Surrey . . . . .	..

Subscriptions.

cxxxix

Name.	Residence.	Sub- scriptions.		
		£	s.	d.
Evans, H. J.	Greenhill, Whitechurch, Cardiff	1	0	0
Evans, W. H.	Ford Abbey, Chard	1	0	0
†Evan-Thomas, Commander A.	Cae Rwnon, Builth			
Evered, P.	Milton Rocks, Dulverton	1	0	0
Fardoe, M.	Woodram Farm, Pitminster, Taunton	1	0	0
†Farmer, S. W.	Little Bedwin, Wilts			
Farwell, Capt. W.	The Priory, Burnham, Bucks.	1	0	0
†Farwell, F. Geo.	Laura Place, Bath			
Fenn, T.	Ludlow Estate Offices, Downton Castle, Bromfield, Salop.	1	0	0
Ferris, G.	Milton Manor, Pewsey, Wilts	1	0	0
Fife, Capt. W.	Langton Hall, Northallerton, Yorks.	1	1	0
Filliter, F.	St. Martins House, Wareham.	1	0	0
Finch, G. P.	The Briars, Alphington, Exeter	1	1	0
Finlay, Alexander	Little Brickhill, Bletchley, Bucks	1	0	0
Finn, G. W.	Westwood Court, Faversham.	1	0	0
Fish, George J.	Churston Court, near Brixham, Devon	1	0	0
Fisher, E.	Mendip Lodge, Langford, Somerset	1	0	0
Fisher, Col. H. Oakdene	Ty Myndd. Radyr., near Cardiff.	1	0	0
Fletcher, C. E.	Kenward, Yalding, Maidstone	1	0	0
†Fletcher, Lionel J. W.	Ewell Manor, West Farleigh, Maidstone			
Fletcher, W. J.	The Chantry, Wimborne	1	0	0
Flower, James	Chilmark, Salisbury	1	0	0
Flower, R. F.	The Hill, Stratford-on-Avon	1	0	0
Flower, Rev. Canon.	Worth Vicarage, Dover	1	1	0
Flower, W. R.	West Stafford, Dorchester	1	1	0
Follows and Bate (Limited)	Gorton, Manchester	1	0	0
Ford, A.	Wraxall Court, Nailsea, near Bristol	1	0	0
*†Forester, Capt. F. W.	Cresswell, Morpeth			
Forrest, R.	St. Fagans, Cardiff	1	0	0
Forster, J. C.	Clatford Mills, Andover	1	0	0
Forster, W. S.	Gore Court, Maidstone	1	0	0
*Fortescue, Earl	Castle Hill, South Molton	2	0	0
Foster-Harter, G. L.	Puckrup Hall, Tewkesbury	1	0	0
Foster, R. L.	Wells, Somerset	1	1	0
Foster Bros.	The Oil Mills, Gloucester	1	1	0
Foster, W.	Ripple Vale, Deal, Kent	1	1	0

Name.	Residence.	Sub- scriptions.
Fowler and De la Perrelle	Gloucester Square, Southampton	£ s. d. 1 0 0
†Fowler, G.	Claremont, Taunton	1 0 0
Fowler, J., and Co. (Limited)	Leeds	1 0 0
Fowler, W. H.	Claremont, Taunton	1 0 0
Fox Brothers and Co.	Wellington, Somerset	1 0 0
Fox, C. L.	Shute Lodge, Wellington. Somers- set.	1 0 0
Fox, Dr. A. E. W.	16, Gay Street, Bath	1 1 0
†Fox, Robert	Falmouth	1 1 0
Foxcroft, C. T.	Hinton Charterhouse, Bath	1 1 0
Foxcroft, E. T. D.	Hinton Charterhouse, Bath	1 1 0
†Franklen, Col. C. R.	Clemenstone, Bridgend	1 0 0
Franklin, J. N.	Bussell's Farm, Huxham, Exeter	1 0 0
Fricker, J. A.	Burton, Mere, Wilts.	1 0 0
Froom, Robert	Yondercott Farm, Uffculme, Devon	0 10 0
Frost, Adam E.	Ottery Villa, Pentonville, New- port, Mon.	1 0 0
Fry, H. A.	19, Monmouth Place, Bath	1 0 0
†Fryer, William Rolles	Verwood Manor, Salisbury	1 1 0
Fuller, E. R.	Bathford, Bath	2 0 0
†Fuller, G. Pargiter.	Neston Park, Corsham	1 0 0
*Fuller, J. M.	Neston Park, Corsham	1 0 0
Fuller, S. and A.	Bath	1 0 0
Fursdon, Charles	Fursdon, Tiverton, Devon	1 0 0
Fursdon, E. S.	Posbury House, Crediton	1 1 0
†Galloway, W. G.	Cridland Farm, Spaxton, Bridg- water	1 1 0
Gardiner, Sons, and Co.	Nelson Street, Bristol	1 0 0
Gardiner, Major H.	Broomfield, Tiverton	1 1 0
Gardner, W. E.	Bedminster, Bristol	2 2 0
*Garratt, Lt.-Col. T. A. T.	Bishop's Court, Exeter	0 10 0
Garth, T. C.	Haines Hill, Twyford	1 1 0
Garton, J. W.	Langhorne, Shepton Mallet	1 1 0
Garton, W.	Roselands, Woolston, Southamp- ton	1 1 0
Gaymer, W.	Mes-rs. W. Gaymer & Son, Attle- borough	1 0 0
Gear, W. H.	Union Street, Bath	1 1 0
Gee, B. G. H.	Lock's Mill House, near Bristol	1 0 0
George, F. R.	Swan Hotel, Wells, Somerset	1 0 0
*†George, William E.	Howe Croft, Stoke Bishop, Bristol	1 0 0
Gerrish, J.	Chipping Sodbury	1 0 0

Name.	Residence.	Sub- scriptions.
		£ s. d.
B. G.	Tunley Farm, Bath	
George	Tunley, near Bath	1 0 0
Antony.	Tyntesfield, Bristol	
J.	Milford, Salisbury	2 2 0
M.	Barrow Court, Flax Bourton, R.S.O., Somerset	
T.	Havet Lodge, Langford, R.S.O., Somerset	1 1 0 1 0 0
r W., Bart.	Cambridge House, Regent's Park, London	1 1 0
D. A., B.Sc.	University Extension College, Reading	1 0 0
ling, Capt. T.	Manor House, Bathford, near Bath	1 0 0
a, J.	Bowden Park, Chippenham	
Richard G., Bart.	Gaunt's House, Wimborne	2 2 0
A.	Seagrove, Sea View, Isle of Wight	1 0 0
H.	Bossington, Allerford, Taunton	1 0 0
C. B.	Woldingfold, Horsham.	
J.	Park Hatch, Godalming	1 1 0
F. B.	Langley Burrell, Chippenham	1 1 0
G. Prior	Derriads, Chippenham	
Sir G., Bart	Beechfield, Corsham	1 0 0
J. R. P.	Compton House, Sherborne	1 0 0
A. J.	Chilton Cantelo, Ilchester	1 0 0
Rev. M. C.	Chilton Cantelo Rectory, Yeovil.	1 0 0
A.	3, Hammet Street, Taunton	1 0 0
anmure	Hatton Court, Threadneedle St., London	1 0 0
gton, W. F.	2, Princes Gate, London, W.	1 0 0
.	Wiston Park, Steyning	1 0 0
Rev. John	Wiston Park, Steyning	2 2 0
, Hugh	Kingston-by-Sea, Brighton	
Right Hon. G. J.,	69, Portland Place, London, W.	1 0 0
E.	Bursar, King's College, Cam- bridge	1 0 0
J.	Bassaleg, Newport, Mon.	1 0 0
rs.	28, Broadwater Down, Tunbridge Wells.	2 2 0
, S. W.	Backwell Hill House, Backwell, Bristol	1 0 0
. L.	Abergwynant Hall, Dolgelly, N. Wales	
.	The Whittern, Kington, Here- fordshire	1 0 0
, Miss	Walton Hall, Warrington	
, Sir G., Bart.	Walton Hall, Warrington	
y, J.	Ebbw Place, Ebbw Bridge, near Newport, Mon.	1 1 0
, W. B.	Haynes Park, Bedford	1 1 0

Name.	Residence.	Sub- scriptions.		
		£	s.	d.
Greenham, W. N.	Overton, West Monkton, Taunton	1	1	0
Greenslade, W. R. J.	Bell House, Trull, Taunton . . .	1	0	0
Greenway, W.	Halse, Taunton	1	0	0
Gregory, Walter	Wellington, Somerset	1	0	0
Griffin, B.	New House, Broad Clyst, Exeter	1	0	0
Griffith, Col. J. G. E.	Fairfield House, Cheltenham . . .	1	0	0
Griffiths, Bros.	West Place Hall, Coity, Bridgend	1	0	0
*†Guest, Merthyr	Inwood, Henstridge, Blandford . .			
Guille, H. G. de C. Stevens . . .	Little Torrington, Devon	1	0	0
Guisse, Sir W. F., Bart.	Elmore Court, Gloucester	1	0	0
Gulley, H. J.	Rodber House, Wincanton	1	0	0
*Gunn, J. E.	Tredelerck, Cardiff	2	0	0
Guyon, Rev. H. C.	The Rectory, Lamyat, Bath	1	0	0
Hall, A. H.	Chilcote Manor House, Wells, Somerset	1	0	0
†Hall, J. F.	Sharcombe, Wells, Somerset . . .			
Hall, T. Farmer	39, Gloucester Square, Hyde Park, London, W.	1	0	0
Halsey, E. J.	104, Drayton Gardens, London, S.W.	1	0	0
Ham, J., jun.	Broadclyst, Exeter	0	10	0
†Hambro, Everard A.	Hayes Place, Beckenham, Kent . .			
Hamilton, Hon. Mrs. A. B.	Sheldons, Hook, Hants	1	0	0
Hancock, C.	The Grey House, Pucklechurch, Bristol	1	1	0
Hancock, C. L.	Manor House, Cothelstone, Taunton	1	0	0
Hancock, Rev. F.	Selworthy, Somerset	1	0	0
Hancock, G. D.	Elm Hill, Grimley, Worcester . . .	1	0	0
Hancock, H. C.	Halse, Taunton	1	0	0
Hancock, R. D.	Halse, Taunton	1	0	0
*Handley, Rev. E.	Bath	2	0	0
Hankey, Col. W. A.	Beaulieu, St. Leonards-on-Sea . . .	1	1	0
Hansard, H. W. and J.	Swansea	1	1	0
Harbord, Rev. H.	East Hoathley Rectory, Hawk- hurst, Sussex	1	0	0
Harbottle, E.	Topsham	1	0	0
Hardeman, H.	Swan Hotel, Tenbury	1	0	0
Harding, T. K.	Ashton Gifford House, Codford, Bath	1	0	0
Harding, R.	Fenswood Farm, Long Ashton, Bristol	1	0	0

Name.	Residence.	Sub- scriptions.		
		£	s.	d.
Webber	Highercombe, Dulverton	1	0	0
, Viscount	South Park, Penshurst	1	1	0
W. H.	Old Bank, Bristol	1	0	0
, and Son.	Ebley, Stroud	1	0	0
.	Brownsell Farm, Stourton Caundle, Stalbridge	1	0	0
G.	Underpark, Lealholm, Grosmont, Yorks	1	0	0
Major-Gen.	West Hay, Wrington, R.S.O., Somerset	1	0	0
McGregor, and Co.	Leigh, Lancashire.	1	0	0
J. D.	Manor House, Morebath, Devon	1	0	0
T.	Williton, Taunton	1	0	0
s, J. Heywood	Bignor Park, Petworth			
, Rev. J. B. H.	Rectory, Chelwood, Bristol.	1	0	0
, Lieut.-Col. W. H.	Malmesbury, Wilts			
. J.	West Pennard, Glastonbury	1	0	0
lt. Hon. Sir A., Bart.	Trevina, Tintagel, Cornwall	1	0	0
James, C. G.	Chagford, Newton Abbott	1	0	0
.	Dorchester, Dorset	1	0	0
.	Shepton Mallet	1	0	0
at-Amory, Sir J. H.,	Tiverton, Devon	2	2	0
at-Amory, I. M.	Hensleigh, Tiverton, Devon	1	0	0
Major G.	Poundisford, Taunton	1	0	0
rson, W.	Berkley House, Frome			
lt.-Col. F.	Elmstree, Tetbury	1	0	0
F. R.	Morebath, North Devon	1	0	0
. W.	Yeomans, Wrington, East Somers- set	1	0	0
ry, Lord	Heytesbury, Wilts	1	1	0
H.	Belluton House, Pensford, Bristol			
arles	Clevedon, Somerset			
l. E. S., C.B.	Rookwood, Llandaff			
mond	Stratton House, Evercreech, Bath	1	0	0
ney	Langford House, Langford, R.S.O.	1	1	0
.	Kilkenny, Shepton Mallet.	1	0	0
, J.	3, Gracechurch St., London, E.C.	1	0	0
y, E. M.	4, Chamberlain Street, Wells, Somerset	1	0	0
y, R. J. B.	Ston Easton Park, Bath	1	0	0
. A., jun.	Manor Farm, Motcombe, Shaftes- bury, Dorset	1	0	0
E.	Ashley Farm, Marnhull, Dorset	1	0	0
C.	37, Fleet Street, London	2	0	0
Sir H. H. A., Bart.	Stourhead, Bruton			
W.	Staplehurst	2	0	0
J. T.	Maisey Hampton, Fairford	1	0	0
ase, H., M.P.	Hadspen House, Castle Cary	2	0	0
tt, S.	Worminster Farm, Shepton Mal- let	1	0	0
on, J. Stewart	Lythe Hill, Haslemere, Surrey	1	0	0

Name.	Residence.	Subscriptions.		
		£	s.	d.
Holland and Coombs	Bristol	1	0	0
Holland, J. R.	Wonham, Bampton, Devon	1	0	0
Holt Needham, O. N.	Castle Cary, Somerset	1	0	0
Hood, Sir A. Acland, Bart., M.P.	St. Audries, Bridgwater	1	1	0
†Hooper, R. N.	Stanshawes Court, Chipping Sodbury	1	1	0
Hopper, H. R.	48, Catford Hill, London, S.E. . . .	1	1	0
†Horner, J. F. Fortescue	1, Whitehall Place, London, S.W. . .	1	0	0
Hornsby and Sons (Limited)	Gantham, Lincoln	1	0	0
Horton, J.	Rabson Farm, Winterbourne Bassett, Swindon	1	0	0
Horton, Rev. Le G.	Wellow Vicarage, Bath.	1	0	0
Horwood, R. E.	Drayton Beauchamp, Tring, Herts.	1	0	0
Hosegood, Obed., jun.	Dillington, Ilminster	0	10	0
Hosken, W. J.	Pulsack, Hayle, Cornwall	1	0	0
Hoskins, Robert.	Beard Hill, Shepton Mallet	1	0	0
Houlton, W.	Broadfield Farm, Northleach, R.S.O.	1	0	0
How, J. H.	Bideford	1	0	0
Howard, E. S.	Thornbury Castle, Glos.	1	0	0
Howard, J. H.	Goldenhayes, Bartley, Totton, Hants	1	0	0
Howard, J. and F.	Britannia Works, Bedford.	1	0	0
Howse, H. J.	London, Gloucester, and N. Hants Dairy Co., Bristol	1	0	0
Hubbard, W. E.	Leonards Lee, Horsham	1	0	0
†Hughes, A. E.	Wintercott, Leominster	1	0	0
Hull, R.	Sutton Benger, Chippenham	1	0	0
†Hulse, Sir Edward, Bart.	Breamore, Salisbury	1	0	0
Hunter, J.	Seed Merchant, Chester	1	0	0
†Hurle, J. Cooke	Southfield House, Brislington, Bristol	1	0	0
Hurman, J.	12, Park Place, Cardiff	1	0	0
Hurst and Son	152, Houndsditch, London	1	0	0
Hussey, F. T.	The Grove, Cheddon Fitzpaine, Taunton	1	0	0
Hussey, John Richards	Beechcroft, St. Davids, Exeter . . .	0	10	0
*Hylton, Lord	Charlton, near Radstock	2	2	0

Name.	Residence.	Subscriptions.		
		£	s.	d.
a, R.	The Hawthorns, Knowle, Warwickshire	1	0	0
ster, Earl of	Melbury, Dorchester	1	0	0
Terry, H. M.	Strete Raleigh, Whimble	1	0	0
, Lieut.-Col. R. B.	Steyning, Sussex	1	1	0
J.	Merton, Surrey	1	0	0
Jas.	Clifton Park, Bristol	1	1	0
on. C.	Hitcham Grange, Taplow	1	0	0
J. C. C.	Brislington Hall, near Bristol	1	1	0
1, Sir H. M., Bart.	Llantillio Court, Abergavenny	1	0	0
1, W.	Manor House, Dawlish, Devon	1	0	0
A. B.	Shovell Hill House, N. Petherton, Bridgwater	1	0	0
2, T. M.	Haseley Iron Works, Tetsworth	1	0	0
3, E. J.	Snowdon Villa, Chard	1	1	0
S. W.	Liskeard, Cornwall	0	10	0
3, Sir J. J.	The Grange, Swansea	1	0	0
3, T.	Pantyscallog, Dowlais	1	0	0
3, W. H. P.	Baglan House, Briton Ferry, S. Wales	1	0	0
, Earl of	Middleton Park, Bicester, Oxon	2	0	0
W.	Thorne, Launcelles, Stratton, Cornwall	1	0	0
Sanitary Compounds				
pany	Cannon Street, London, E.C.	1	0	0
.	The Firs, Shootup Hill, Brondesbury, N.W.	1	0	0
C. D.	Chaldeans Stud Farm, St. Fagans, Cardiff	1	0	0
E.	Cowbridge, Glamorgan	1	0	0
one, R.	River View, Cardiff	1	0	0
e, Hon. G., M.P.	Amerdown Park, Radstock			
, F. N.	Crisball Grange, Saffron-Walden			
, George	Ickleton, Saffron-Walden			
, Henry Parr	Beaufort House, Winchester			
D. E.	Llancaiach House, Llancaiach, Glam.	1	1	0
Major F. J.	Chippenham	1	0	0
W. L.	Energlyn, Cathedral Road, Cardiff	1	1	0
James B., and Co.	Journal Office, Bath	1	0	0
J. V.	Shaw Farm, Melksham	1	0	0
id Co.	Gloucester	1	0	0
F.	Sarisbury Green, Southampton	1	1	0
, C. A.	Timsbury, Bath	1	0	0
, L. J.	Maer Farm, Exmouth			
-Tynite, St. David M.	Goathurst, Bridgwater	1	0	0
vay, Rt. Hon. Sir J. H., M.P.	Escot, Ottery St. Mary.	1	1	0

Name.	Residence.	Subscriptions.
		£ s. d.
Holland and Coombs	Bristol	1 0 0
Hollond, J. R.	Wonham, Bampton, Devon	1 0 0
Holt Needham, O. N.	Castle Cary, Somerset	1 0 0
Hood, Sir A. Acland, Bart., M.P.	St. Audries, Bridgwater	1 1 0
†Hooper, R. N.	Stanshawes Court, Chipping Sod- bury	1 1 0
Hopper, H. R.	48, Catford Hill, London, S.E.	1 0 0
†Horner, J. F. Fortescue	1, Whitehall Place, London, S.W.	1 0 0
Hornsby and Sons (Limited)	Grantham, Lincoln	1 0 0
Horton, J.	Rabson Farm, Winterbourne Bas- sett, Swindon	1 0 0
Horton, Rev. Le G.	Wellow Vicarage, Bath.	1 0 0
Horwood, R. E.	Drayton Beauchamp, Tring, Herts	1 0 0
Hosegood, Obed., jun.	Dillington, Ilminster	0 10 0
Hosken, W. J.	Pulsack, Hayle, Cornwall	1 0 0
Hoskins, Robert.	Beard Hill, Shepton Mallet	1 0 0
Houlton, W.	Broadfield Farm, Northleach, R.S.O.	1 0 0
How, J. H.	Bideford	1 0 0
Howard, E. S.	Thornbury Castle, Glos.	1 0 0
Howard, J. H.	Goldenhayes, Bartley, Totton, Hants	1 0 0
Howard, J. and F.	Britannia Works, Bedford.	1 0 0
Howse, H. J.	London, Gloucester, and N. Hants Dairy Co., Bristol	1 0 0
Hubbard, W. E.	Leonards Lee, Horsham	1 0 0
†Hughes, A. E.	Wintercott, Leominster	1 0 0
Hull, R.	Sutton Benger, Chippenham	1 0 0
†Hulse, Sir Edward, Bart.	Breamore, Salisbury	1 0 0
Hunter, J.	Seed Merchant, Chester	1 0 0
†Hurle, J. Cooke	Southfield House, Brislington, Bristol	1 0 0
Hurman, J.	12, Park Place, Cardiff	1 0 0
Hurst and Son	152, Houndsditch, London	1 0 0
Hussey, F. T.	The Grove, Cheddon Fitzpaine, Taunton	1 0 0
Hussey, John Richards	Beechcroft, St. Davids, Exeter	0 10 0
*Hylton, Lord	Charlton, near Radstock	2 2 0

Name.	Residence.	Subscriptions.		
		£	s.	d.
R.	The Hawthorns, Knowle, Warwickshire	1	0	0
er, Earl of	Melbury, Dorchester	1	0	0
erry, H. M.	Strete Raleigh, Whimble	1	0	0
Lieut.-Col. R. B.	Steyning, Sussex	1	1	0
.	Merton, Surrey	1	0	0
as.	Clifton Park, Bristol	1	1	0
1. C.	Hitcham Grange, Taplow	1	0	0
T. C. C.	Brislington Hall, near Bristol	1	1	0
Sir H. M., Bart.	Llantillio Court, Abergavenny	1	0	0
W.	Manor House, Dawlish, Devon	1	0	0
. B.	Shovell Hill House, N. Petherton, Bridgwater	1	0	0
T. M.	Haseley Iron Works, Tetsworth	1	0	0
E. J.	Snowdon Villa, Chard	1	1	0
i. W.	Liskeard, Cornwall	0	10	0
Sir J. J.	The Grange, Swansea	1	0	0
T.	Pantyscallog, Dowlais	1	0	0
W. H. P.	Baglan House, Briton Ferry, S. Wales.	1	0	0
Earl of	Middleton Park, Bicester, Oxon	2	0	0
.	Thorne, Launcelles, Stratton, Cornwall	1	0	0
Sanitary Compounds				
ny	Cannon Street, London, E.C.	1	0	0
.	The Firs, Shootup Hill, Brondesbury, N.W.	1	0	0
D.	Chaldeans Stud Farm, St. Fagans, Cardiff	1	0	0
.	Cowbridge, Glamorgan	1	0	0
e, R.	River View, Cardiff	1	0	0
Hon. G., M.P.	Amerdown Park, Radstock			
P. N.	Crishall Grange, Saffron-Walden			
George	Ickleton, Saffron-Walden			
leury Parr	Beaufort House, Winchester			
E.	Llancaiach House, Llancaiach, Glam.	1	1	0
Major F. J.	Chippenharn	1	0	0
. L.	Energlyn, Cathedral Road, Cardiff	1	1	0
ames B., and Co.	Journal Office, Bath	1	0	0
. V.	Shaw Farm, Melksham	1	0	0
Co.	Gloucester	1	0	0
.	Salisbury Green, Southampton	1	1	0
C. A.	Timsbury, Bath	1	0	0
. J.	Maer Farm, Exmouth			
ynste, St. David M.	Goathurst, Bridgwater	1	0	0
y, Rt. Hon. Sir J. H., M.P.	Escot, Ottery St. Mary.	1	1	0

Name.	Residence.	Subscriptions.
		£ s. d.
Kennedy, D.	The Forbury, Reading	1 0 0
†Kettlewell, W. W.	East Harptree Court, Bristol . . . . .	..
*Keyser, C. E.	Aldermaston Court, Reading	2 0 0
Keyworth, J. & H., and Co.	35, Tarleton Street, Liverpool	1 0 0
Kidner, E.	Cothelstone Manor, Taunton	1 0 0
Kidner, John	Nynehead, near Wellington, Som.	1 0 0
Kidner, S.	Bickley Farm, Milverton, Somerset	1 0 0
Kidner, W.	Fennington, Kingston, Taunton	1 0 0
Kindersley, E. L.	Clyffe, Dorchester	1 0 0
King, G. F.	Chewton Keynsham, Bristol	1 0 0
King, J. P.	North Stoke, Wallingford	1 0 0
King, R. Moss	Ashcott Park, Bridgwater	1 0 0
King and Son, R.	Milsom Street, Bath	1 1 0
King, Sir Wm. D.	Stratford Lodge, Southsea	0 10 0
Kingscote, T.	The Trench, Tonbridge	1 0 0
Kinneir, H.	Redville, Swindon	1 0 0
Kirkham, W.	Bangley Farm, Tamworth	1 0 0
Knight, R.	Troytes Farm, Tivington, Minehead	0 10 0
Knight, S. J.	Dundry, Somerset	1 0 0
†Knollys, C. R.	Grange Cottage, Alresford, Hants . . . . .	..
†Kruise, W.	Leeds, near Maidstone . . . . .	..
†Lake, C.	Oakley, Higham, Kent . . . . .	..
Lampport, Messrs. C.	Bindon House, Wellington, Som.	1 0 0
Lance, C. E.	Stoke Court, Taunton	1 0 0
Lane, A. P. . . . .	..	1 1 0
Lang, W. and J.	Hambridge, Somerset	1 0 0
Langley, B. W.	King's Lynn, Norfolk	1 0 0
Lankester, P.	Messrs. Lankester & Co., 71, Southwark Street, London, S.E.	1 0 0
*Lansdowne, Marquis of	Bowood, Calne	2 0 0
Larkworthy, E. W.	Messrs. J. L. Larkworthy & Co., Worcester	1 0 0
Lascelles, Rev. E.	Newton St. Loe, Bristol	1 0 0
†Latham, T.	Dorchester, Oxon . . . . .	..
Laver, J. G.	Northover, Glastonbury	1 0 0
*Laverton, W. H.	Leighton House, Westbury, Wilts	2 0 0
Lawrence, J.	Stall Pitt's Farm, Shrivenham	1 0 0
Lawrence, J. H. H.	1, Lynwid Villas, Bath	1 1 0
*Leconfield, Lord	Petworth, Sussex	2 0 0
Lee, Major-Gen. H. H.	The Mount, Dinas Powis, near Cardiff	1 0 0
Leech, T.	Beaufort Arms Hotel, Raglan	0 10 0
Lees, Elliott, M.P.	South Lychett Manor, Poole, Dorset	1 1 0

Name.	Residence.	Sub- scriptions.		
		£	s.	d.
E. Gapper	Melplash Court, Melplash, Dorset	1	0	0
H.	Court Lodge, West Farleigh, Kent	1	0	0
ard, Sir J. Farnaby, rt.	Wickham Court, West Wickham, Kent	3	0	0
ridge, Charles	Carlton Club, Pall Mall, London .	1	0	0
bridge, J. C. Baron	Tregeare, Launceston			
bridge, W.	Courtlands, Lympstone	2	0	0
ton, W.	Woolleigh Barton, Beaford, North Devon	0	10	0
, James	Plasdraw, Aberdare	1	1	0
, Sir W. T.	The Mardy, Aberdare	1	0	0
, Wm., and Son	Herald Office, Bath	1	0	0
John Henry	Trehill, Exeter			
and, C. J.	Haggerston Castle, Beal, North- umberland			
n, E., M.D.	Silver Street House, Taunton . . .	1	0	0
cott, R. C. C.	Over Court, near Bristol	1	0	0
omb, G.	Frogholt, Hythe, Kent	1	0	0
rne, Earl of	Crosswood, Aberystwith, S. Wales			
r, J. J.	Warninglid Grange, Haywards Heath			
, R. A., and Co.	Dursley, Gloucestershire	1	1	0
gattock, Baron	The Hendre, Monmouth			
lyn, Evan H., M.P.	Langford Court, Langford, Bristol	1	1	0
lyn, W. J.	Southwood, Tiverton	1	0	0
elyn, Sir J. T. D., Bart., .P.	Penllergare, Swansea	2	2	0
, Herbert	Plas Cilybebyll, Swansea	1	1	0
J. C.	Saltford, near Bristol	1	0	0
, A. C. E.		1	0	0
G.	Ogbourne St. Andrew, Marl- borough	1	0	0
g, Rt. Hon. Walter H., P.	Rood Ashton, Trowbridge			
Col. William	Woodlands, Congresbury, Somerset	1	0	0
H. Y. Buller	Maristow, Roborough, Plymouth.	1	0	0
s, Rt. Hon. Sir M., Bart.	Maristow, Roborough, Devon . .	2	0	0
t Brothers	Cathedral Dairy Co., Exeter . . .	1	1	0
, E. Q.	Langport	1	0	0
ice, Amos	Winsford, Dulverton	0	10	0
ce, T.	Bossington, Allerford, Taunton .	1	0	0
i, F. C.	St. James' Dairy, Bath	1	0	0
ock, Sir John, Bart., M.P.	High Elms, Hayes, Kent			
. Lt.-Col. H. F. E.	Dunchideock House, near Exeter .	1	0	0
y, J. B.	Brockampton, Worcester			
ll, Capt. A. F.	Court House, East Quantoxhead, Bridgwater	1	0	0
ll, Rev. A. H. F.	Minchhead, Bridgwater	1	0	0
ll, G. F.	Dunster Castle, Somerset	1	0	0

Name.	Residence.	Sub- scriptions.
*MacAndrew, J. J.	Lukesland, Ivybridge	£ s. d. 2 0 0
MacCalmont, H. L. B.	Bishopswood, Ross.	1 1 0
McCreath, J., F.C.S.	Bosvigo Farm, Truro	1 0 0
McGregor, A. G.	Lake Farm, Bishops Cleeve, near Cheltenham	1 0 0
McIntosh, Mrs. C. M.	Havering Park, Havering Atte Bower, Essex	1 0 0
Major, H. J., and C. (Limited)	Bridgwater	1 0 0
Mallock, Richard, M.P.	Cockington, Torquay	1 0 0
Manfield, J.	Hambridge, Curry Rivell, Taun- ton	1 1 0
†Mansell, A. E.	Astol, Shifnal, Salop . . . . .	..
Maple, Sir J. B., Bart., M.P.	Childwickbury, St. Albans	1 0 0
Marcus, M.	High Trees, Redhill, Surrey	1 0 0
Marker, Richard.	Combe, near Honiton	1 0 0
Marshall, J. T.	Highridge Farm, Dundry, Souer- set.	0 10 0
Marshall, Sons, and Co.	Britannia Iron Works, Gainsboro'	1 1 0
Marten, G. N.	Marshals Wick, St. Albans	1 0 0
Martin, Christopher	Broad Clyst, Exeter	0 10 0
†Martin, G. E.	Ham Court, Upton-on-Severn . . . . .	..
Martin, J.	Thorverton, R.S.O., Devon	1 0 0
*Maskelyne, N. Story	Basset Down House, Swindon	2 2 0
Mason, A.	North Hill, Swansea	1 0 0
*Mason, J.	Eynsham Hall, Oxon	2 0 0
Massey, F. I.	54 & 55, Bunhill Row, London, E.C.	1 0 0
Mathews, Ernest	Chequers Mead, Potters Bar	1 0 0
Mathias, W. H., J.P.	Porth, near Pontypridd	1 0 0
Maule, M. St. John	Chapel House, Bath	1 0 0
May, A. C.	Avon House, Stoke Bishop, Bristol	1 0 0
Maynard, W. T.	Yeovil	1 0 0
†Mayo, Henry	4, Temple Terrace, Dorchester . . . . .	..
†Mayo, John	Coker's Frome, Dorchester . . . . .	..
McMurtrie, J.	Southill, Radstock, near Bath	1 0 0
Meade, F.	Langport, Somerset	1 0 0
Medland, W. R.	Yard Farm, Silverton, Cullompton	0 10 0
Medlicott, Henry E.	Potterne, Devizes	1 0 0
Meek, A. Grant	Hillworth House, Devizes	1 1 0
Merry, Richard	Goulds, Broad Clyst, Exeter	1 0 0
Merry, W. F.	Ash Clyst, Broad Clyst, Exeter	1 0 0
Merryweather, J. C.	Hollies, Blackheath	1 0 0
Methuen, Major-Genl. Lord, C.B., C.M.G.	Corsham Court, Wilts	1 0 0
Micklem, H. . . . .	.. . . .	1 0 0
Middleton, Hastings N.	Bradford Peverell, Dorchester.	1 0 0
Mildmay, Rev. A. St. J.	Hazlegrove, Sparkford, Bath	1 1 0
Mildmay, Capt. C. B. St. J.	Hallam, Dulverton	1 0 0
*†Mildmay, Sir H. St. John, Bart.	Dogmersfield Park, Hartford Bridge, Winchfield . . . . .	..
†Mildred, G. B.	Butleigh, Glastonbury . . . . .	..
Miles, A.	Winchcombe Street, Cheltenham	1 0 0

Name.	Residence.	Subscriptions.
		£ s. d.
Sir H. R., Bart.	Abbots Leigh, Clifton, Bristol	1 0 0
l, H.	Shrivenham, Berks	1 0 0
l, J. F.	Rutleigh, Glastonbury	1 0 0
P. L.	Ruddington Hall, Nottingham	1 0 0
l, T. S.	Montford, Shropshire, R.S.O.	1 0 0
use, H.	St. George's Hill, Easton-in-Gordano	1 0 0
ell, F. J.	Llanfreckfa Grange, Caerleon, Mon.	1 0 0
C. J.	5, Buckingham Gate, London, S.W.	1 0 0
agu, Lord	Palace House, Beaulieu, Hants	2 0 0
fore, Sir F., Bart.	Worth Park, Crawley	1 1 0
, C.	Weston House, Evercreech	1 0 0
, H. F.	42, Angel Road, Brixton, London, S.W.	3 0 0
-Stevens, J. C.	Winscott, Gt. Torrington, Devon	2 2 0
on, Lord	Sarsden House, Chipping Norton	2 0 0
an, Hon. F. C.	Ruperra Castle, Newport, Mon.	1 0 0
n-Richardson, C.	Noyadd Wilym, Cardigan	1 1 0
id, Charles W.	Elmscroft, West Farleigh, Maidstone	2 0 0
y, Earl of	Saltram, Plympton, Devon	2 2 0
ill, G. Herbert, M.P.	Headington Hill Hall, Oxford	1 1 0
and Griffin (Limited)	Maindee, Newport, Mon.	1 0 0
, Son & Peard	Auctioneers, North Curry, Taunton	1 0 0
, Sir R. A.	Sketty Park, Swansea	1 0 0
, W.	4, Norton Road, Hove, Brighton.	1 0 0
son, Alfred	Fonthill House, Tisbury	2 2 0
it, G. W.	Wasing Place, Reading	1 0 0
t-Edgcumbe, Earl of	Mount-Edgcumbe, Devonport	1 0 0
stevens, J.	Railway Hotel, Yatton	1 0 0
low, E.	Castlehead Grange, Lancashire	2 2 0
low, E., jun.	Bury, Lancashire	1 0 0
ns, W. H.	Westfield Place, Battle, Sussex	1 0 0
is, T.	Aberfeldy, The Shrubbery, West-ton-super-Mare	1 0 0
, Capt. G.	Elmsleigh, Send, Woking	1 1 0
, P. A., M.P.	Dunsmore, near Rugby	1 0 0
y, Col. Wyndham, M.P.	10, Rutland Gate, London, S.W.	1 0 0
y-Anderdon, H. Edward	Henlade House, Taunton	1 0 0
, Col. W. D.	84, Cornwall Gardens, London, S.W.	1 1 0
; H. B.	Chippenham	1 1 0
r, G.	Lee Farm, Wisboro' Green, Billingshurst, Sussex	1 1 0
e, F.	Macknade, Faversham	1 0 0
, Sir A. W., Bart.	Grittleton, Chippenham	1 0 0
r, C. W.	Carnarvon Arms, Dulverton, Somerset	0 10 0
W. W.	The Grange, Wenvoe, Glamorgan	1 0 0

Name.	Residence.	Sub- scriptions.
		£ s. d.
†Neville-Grenville, Robert	Butleigh Court, Glastonbury . .	..
Newton, F. M.	Barton Grange, Taunton . . .	1 0 0
†Newton, J. G.	Millaton House, Bridestowe, Oke- hampton . . . . .	..
Nix, Mrs. S.	Tilgate, Crawley, Sussex . . .	1 0 0
Nock, E.	Brockton House, Shifnal, Salop .	1 0 0
*Normanton, Earl of	77, Pall Mall, London, S.W. . .	2 0 0
Norman, H. T.	Cushuish, Kingston, Taunton. .	1 0 0
Norrish, Thomas	Churchill Farm, Loxbeare, Tiverton	0 10 0
Northcote, Hon. Sir S. H., Bart., M.P.	25, St. James's Place, London, S.W.	1 0 0
Norton, R.	Woodbourne, Shepton Mallet . .	1 1 0
Okeden, Col. U. P. . . .	Turnworth, Blandford	1 0 0
Oldfield, W.	Berrets Hall, Walton, S.O., Nor- folk	1 0 0
Oliver-Bellasis, Captain . .	Shilton House, Coventry . . .	1 0 0
*Onslow, Earl of, G.C.M.G. .	7, Richmond Terrace, Whitehall, London, S.W.	2 0 0
†Ormerod, Miss E. A. . . .	Torrington House, St. Albans . .	..
Osborn, C.	Woolston, North Cadbury, Bath .	1 0 0
Osborne, J.	9, Clifton Park, Clifton	1 0 0
Ovey, R.	Badgemore House, Henley-on- Thames	1 0 0
Paget, L. C.	Amerdown, Radstock	1 0 0
*Paget, Rt. Hon. Sir R. H., Bt.	Cranmore Hall, Shepton Mallet .	2 0 0
Pain, Charles	Grosvenor House, Stockbridge, Hants	1 1 0
Palairer, H. H.	Cattistock Lodge, Dorchester . .	1 1 0
Palmer, G. W.	Marlston House, Newbury . . .	1 0 0
†Palmer, R.	Lodge Farm, Nazeing, Waltham Cross . . . . .	..
Parker, Admiral	Delamore House, Ivybridge . . .	1 0 0
†Parker, Hon. Cecil J. . . .	Eaton Estate Office, Eccleston, Chester . . . . .	..
Parker, Col. R. J. H. . . .	Bywood Cottage, Woolston, Southampton	1 0 0
Parker, H. C. G.	Brockton Grange, Shifnal, Salop .	1 0 0
Parker, T.	High Street, Shepton Mallet . .	1 0 0
Parkin, Paxton William . . .	3, Major Terrace, Seaton, Devon .	1 0 0
†Parmiter, Wm.	The Axe, Crewkerne . . . . .	..
Parry, T.	Newport, Mon.	1 0 0
†Parsons, H. J. D.	Bampfylde House, Exeter . . .	..
†Parsons, J. D. Toogood, jun.	Ashurst Place, Langton, Tun- bridge Wells . . . . .	..
Parsons, R. M. P.	Misterton, Crewkerne, Somerset.	1 0 0
Part, C. T.	Aldenham Lodge, Radlett, St. Albans	1 0 0

Name.	Residence.	Subscriptions		
		£	s.	d.
	Castle Hill, Bletchingley, Surrey	1	0	0
	The Manor House, Wootton Fitz-			
	paine, Charmouth	1	0	0
	14, Union Street, Bath	1	0	0
W.	African Chambers, Liverpool.	1	0	0
T.	Shirley, Southampton	1	1	0
	Coombe Lodge, Bruton	1	0	0
L.	Tangier Park, Basingstoke	1	0	0
T. Cole	Pendarves, Camborne, Cornwall	1	1	0
as	Taunton	1	0	0
	Musgrove Farm, Taunton	1	0	0
	Somerset Court, Brent Knoll,			
	Highbridge	1	1	0
E. K.	Shales, Bittern, Hants	1	0	0
ck, Mrs.	Beau Manor Park, Loughborough			
	Mark House, Mark, Highbridge	1	0	0
Parsons	2, Park Villas, Ashley Road,			
	Epsom	0	10	0
	Acland Barton, Landkey, Barnstaple			
T. Valentine,				
L.	The Limes, Tetbury, Gloucester			
D.	The Gaer, Newport, Monmouth			
ev. H. J.	Walkern Rectory, Stevenage	1	1	0
	Pendoggett, Timsbury, near Bath	1	1	0
C.	Weston Bampfild, Sparkford, Bath	1	0	0
s, and Co., Lutd.	Bedford Foundry, Leigh	1	0	0
iers and Co.	59, Bishopsgate Street Without,			
	London	1	0	0
	High Pennard House, Bryn Road,			
	Swansea	1	0	0
rylsman C.	Berwick St. James, Salisbury			
	The Grange, Somerton, Somerset	1	0	0
W.	Farnley House, Dursley, Glos.			
	Somerton, Somerset			
	Merryland, Galhampton	1	0	0
	The Firs, Highbridge	1	0	0
ord	Poltimore Park, Exeter.	3	3	0
os. R.	Polwhele, Truro	1	1	0
	Blandford, Dorset	1	0	0
	9, 10 and 11, Queen Square, Bath	1	0	0
	Marksbury, near Bath	1	0	0
	Dorchester	1	0	0
	The Shrubbery, Barnfield, Exeter	1	0	0
	Beresford Manor, Plumpton,			
	Lewes	1	0	0
W. J. P.	Godmanstone Rectory, Dorchester			
	New London Hotel, Exeter	1	0	0
	Edgarley, Glastonbury	1	0	0
ille.	Laverstoke House, Micheldever	2	0	0
tham	Malshanger, Basingstoke	1	0	0
	Denewood, Broadlands Road,			
	Highgate, London, N.			

Name.	Residence.	Subscriptions.		
		£	s.	d.
†Portman, Hon. C. B.	Child-Okeford, Blandford, Dorset . . . . .			..
†Portman, Hon. E. W. B.	Hestercombe, Taunton . . . . .			..
*Portman, Viscount	Bryanston, Blandford	5	0	0
Potter, F. P.	Gate Works, King's Lynn	1	0	0
Powell, R. H.	Lewes, Sussex	1	0	0
Power, M. K. M.	Aston Court, Ross	1	0	0
*Poynder, Sir J. Dickson, Bart., M.P.	Hartham Park, Corsham	2	0	0
Pratt, J. D.	Pratts Hayes, Exmouth	1	0	0
Price, Hermann C.	Drayton, near Taunton	1	0	0
Price, J. W.	Newport Pottery Co., Newport, Mon.	1	0	0
*Prior, R. C. A.	Halse House, near Taunton	2	0	0
Proctor, H. and T.	Cathay, Bristol	1	1	0
Puddy, G. A.	Huntspring, Bridgwater	1	0	0
Pulley, Sir J.	Lower Eaton, near Hereford	1	0	0
†Purgold, A. D.	Park View Farm, Combermere, Whitchurch, Salop . . . . .			..
Purrott, W.	Cunnynhamie Hill, St. Albans	1	0	0
Pyatt, G. H.	Park Farm, Bath.	1	0	0
Quirk, Rev. Canon	Bath	1	0	0
*Ramsden, J. C.		2	0	0
Ransome, James Edward	Orwell Works, Ipswich	1	1	0
Rashleigh, Jonathan	Menabilly, Par Station, Cornwall	1	0	0
Rawlence, Ernest A.	Newlands, Salisbury.	1	0	0
Read, A. M.	Livingshayes, Silverton	1	0	0
Read, B.	Brooklands, Burnett, near Bristol	1	0	0
Reeves, Robert and John, and Son	Bratton Iron Works, Westbury, Wilts	1	0	0
Reid, P. V. A.	Belcombe Brook, Bradford-on-Avon	1	0	0
Rendell, R. F.	Kingston House, Staverton, Totnes	1	0	0
Reynolds, W.	High Ham, Langport	0	10	6
Rice, H. E. H.	Dane Court, Dover	1	0	0
Rich, F. W.	Royal Nurseries, Sandford, Bristol	1	0	0
Richards, T. B.	East Pennard, Somerset	1	0	0
Richards, W. F.	Beaumont, Broad Clyst, Exeter	1	0	0
Richardson, E. E.	Glanbrydan Park, Carmarthen	1	0	0
Richardson, J. C.	Glaubrydan Park, Manordilo, R.S.O., Carmarthen	1	0	0
Rickeard, Silas	Newlyn East, Grampound Road, Cornwall	1	0	0
Ridler, James	Blackford, Selworthy, Minehead	1	0	0
Ridler, T. K.	Minehead, Taunton	1	0	0

Name.	Residence.	Subscriptions.
Henry	Lyminge, Hythe, Kent	£ s. d. 1 0 0
Genl. Fox-Pitt . . .	Rushmore Lodge, Salisbury . .	1 0 0
, Lord	Lanhydroc, Bodmin	2 0 0
3. and H. (Limited)	Deanshanger Ironworks, Stony Stratford, Bucks	1 0 0
J. D. Cramer	Thornton, Frant, Sussex	1 1 0
l., and Son	Bridgwater	1 1 0
, R. T.	The Church Farm, Babraham, Cambridge	1 0 0
.	High Bray, South Molton	0 10 0
S.	Lynhales, Kington, Herefordshire	1 0 0
John, and Co.	Bristol	1 1 0
& Auden (Limited)	Wantage, Berks	1 0 0
W. Buckley	Llanelly	1 0 0
J.	West Pennard, Glastonbury . . .	1 0 0
n. Mark	Stevenstone, Torrington	1 1 0
.	Distillery, Hereford	1 0 0
James	West Town, R.S.O., near Bristol	1 0 0
d, Lord	Tring Park, Herts	1 0 0
R.	Banham, Attleborough, Norfolk .	1 0 0
E. L.	Hall Place, Cranleigh, Guildford	1 0 0
ernsey Agricultural rticultural Society .	Guernsey	1 0 0
H.	Sherborne	0 10 0
d Proctor	Sheaf Iron Works, Lincoln . . .	1 0 0
d, J. A.	Highclere Castle, Newbury, Berks	1 0 0
.	North Cadbury, Bath	1 0 0
Howard P.	Moxhull Park, Erdington . . . .	. . .
.	Buchan Hill, Crawley, Sussex . .	1 0 0
, T. H.	Beckington Rectory, Bath	1 0 0
rmans, Earl of . . .	Port Elliot, St. Germans, R.S.O., Cornwall	3 3 0
Lord P.	Barton Hall, Loughborough, Leicester	1 0 0
I. C.	North Fields, Bridgwater	1 0 0
W.	Yonder Broadpool Farm, Doul- ting, Shepton Mallet	1 0 0
njamin	Newlands, Broad Clyst, Exeter . .	1 0 0
a, Rt. Hon. Sir B.,	Banbury	1 0 0
, Ernest	Bodicote Grange, Banbury	1 1 0
3. A.	Stoke House, Exeter	1 0 0
E. J.	Stoke House, Exeter . . . . .	. . .
Rev. L.	Rectory, Whimble, Devon	1 0 0
W. D.	Manor Farm, Grenton, Bridg- water	1 0 0
2. C. A.	Nynehead, Wellington, Somerset	1 1 0

Name.	Residence.	Sub- scriptions.
		£ s. d.
Saunders, C. M.	Boracott, Brandiscorner, N. Devon	1 0 0
Saunders, G., jun.	Lydeard House, Taunton	1 0 0
*Scobell, Col. Barton L. J. . . .	Kingwell Hall, High Littleton, near Bristol	2 2 0
Scott-Hall, H.	Dormington Court, Hereford . . .	1 0 0
Scott, R. W.	East Lambrook, S. Petherton . . .	1 0 0
†Scott, T.	Ditton Court, Maidstone . . . .	..
*Scrattin, D. R.	Ogwell, Newton Abbott	2 2 0
Search, Miss B.	Cowie, Stonehaven, N.B.	1 0 0
†Seaton, Lord	Beechwood, Plympton, Devon . . .	..
Senior, H.	Rushton, Blandford, Dorset . . .	1 0 0
†Seymour, R. A. H.	46, Earl Street, Maidstone (Hon. Local Sec., 1884) . . . . .	..
Shackell, R.	Lower Swainswick House, Bath . .	1 0 0
Shakerley, Col. H. W.	Burgate, Godalming	1 0 0
Shaw, J. E.	Deane Court, Bishops Lydeard, Somerset	1 0 0
†Shaw-Stewart, Walter R.	Berwick House, Hindon, Salis- bury . . . . .	..
Shears, W.	Lee Farm, Pyrford, Woking Station	1 0 0
Shelley, Sir John, Bart.	Shobrooke Park, Crediton	1 1 0
Sheppy, J.	Iwoods House, Congresbury, Bristol	1 0 0
†Sherston, Major C. D.	Evercreech, Somerset . . . . .	..
†Sherston, T. P. D.	Tyddynllan, Corwen, N. Wales . .	..
Shore, J. H.	Whatley House, Frome	1 0 0
Sillifant, A. O.	Coombe House, Copplestone, N. Devon	1 0 0
Sims, G. T.	Land Agent, Abbey Road, Neath . .	1 0 0
†Simmons, Henry	Bearwood Farm, Wokingham . . .	..
Simpson, F. C.	Maypool, Churston Ferrars, R.S.O., S. Devon	1 0 0
Sinclair, James	9, New Bridge Street, Ludgate Circus, London, S.E.	1 0 0
*†Singer, A. M.	Redworth, near Totnes . . . . .	..
*Singer, W. M. G.	Streatfield, Paignton, Devon . . .	5 0 0
Skinner, A. C.	Pound Farm, Bishop's Lydeard, Taunton	1 0 0
*Skrine, Henry Duncan	Claverton Manor, Bath	2 0 0
Skrine, Col. H. M.	Warleigh Manor, Bath	1 1 0
Slade, A. H.	Stock Exchange, London, E.C. . . .	1 0 0
*Slater, A.	Gloucester Carriage Works, Glou- cester	2 2 0
Smart, G. E.	Combe Hay Manor, Bath	1 1 0
Smith, A. J.	Highgrove, Totterdown, Bristol . .	1 0 0
*Smith, Hon. W. F. D., M.P. . . .	Greenlands, Henley-on-Thames . . .	5 0 0
Smith, Hugh C.	Mount Clare, Roehampton	1 0 0
†Smith, J. W.	Thinghill Court, Hereford . . . .	..
†Smith, S. Lee	Larkfield, Maidstone
Smith, W.	Sundon House, Clifton Down, Bristol	1 0 0

Subscriptions.

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Name.	Residence.	Sub- scriptions.
		£ s. d.
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clvii

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(25) Total	1214	

INDEX.

- MILK, 152
 t. Hon. Sir T. D. In Me-
 1
 on of Dairy Produce, 259
 al Shows, 71
 in Cow-Stalls, 244

 Curd Knives, 163
 of Cider, 1898 Exhibition,

 xhibitions, lxxvii
 eeting, 218
 mposition of, 214
 , 1898.. lxiv
 Wortley, on Sheep-Scab, 25

 135, 251
 Plants, 172
 , 216
 on Grass-land, 186
 Privileges, lxxix
 Farm Schools in, 88
 ce, 133
 seeds" of, 60
 n Clotted Cream, 124
 t at Cardiff, 222

 EEDS, 53
 eting, 1898.. i
 ds of, 60
 , W., on Plant Foes of the
 128
 rt on Fenswood Farm, 143
 of Cows, Effect of, 254
 Destruction of, 243
 heese-Making, F. J. Lloyd

 Ripening of, 163
 mposition of, 168
 ing in Cornwall, 127
 l, 136
 le Constituents in, 166
 Privileges, lxxx
 ibits, Analyses of, 1898..

 t. Farwell on 1898 Exhi-
 90
 t.—F. S.

 Cider Investigations by F. J. Lloyd,
 203
 Clotted Cream, 121
 Clover Seeds, 55
 Combination among Agriculturists, 71
 Committees, 1898-99.. lxxiv
 Composition of Apples, 214
 — of Apple-juice, 206
 — of Curd, 158
 — of Milk, 158
 — of Scalded Cream, 124
 — of Whey, 158
 Conditions of Entry, xcix
 Consulting Chemist, Annual Report
 of, 216
 Continent, Co-operation on the, 80
 Co-operation among Agriculturists,
 R. H. Rew on, 71
 Corn-dressing Machines, 112
 Cornwall, Dairying in, 117
 Council, Members of, lxxiii
 Cow-Stalls, Air Space in, 244
 Cranesbills, Seeds of, 56
 Cream, Acidity of, 242
 —, Scalded, Composition of, 124
 Cultivators, 95
 Curd, Moisture in, 161

 DAIRY APPLIANCES, 113
 Dairying in Cornwall, by J. McCreath,
 117
 Dairy Produce, Adulteration of, 259
 — Schools, the Society's, 136
 Darby, Joseph, on Farm Implements,
 95
 Denmark, Co-operative Societies in, 83
 Dipping, Dangers of, 37
 Dips and Dipping, 36
 Dissolved Bones on Grass-land, 183
 Docks, Seeds of, 56
 Dodder, 57, 132
 Drills for Corn and Seed, 103
 Duck Rearing, 229
 Dutch Clover Seeds, 58

 EDUCATIONAL OBJECTS OF CO-OPERA-
 TION, 74
 Entries at Cardiff, 219

- Exeter Meeting, lxxxiv
Exhibition at Cardiff, Society's, 217
- FÆCAL TAINT IN CURD, 171
Farm Schools, G. E. Lloyd-Baker on, 88
Farm Seeds, Prof. John Percival on, 44
Farming, Systems of, 241
Farmyard Manure on Grass-land, 182
Farriery Schools, 136
Farwell, F. G., on 1898 Exhibition of Cider, 190
"Feeding of Live Stock" Review, 253
Feeding Stuffs, Guide to Purchase of, lxxxi
Fermentation, 208
Fertilisers, Guide to Purchase of, lxxxi
Fescue Seeds, 68
Filtering Cider, 209
Financial Statement, 1898 . . cxiii
"Food Supply," 252
Foxtail, Seeds of, 64
Fungi, 133
- GENERAL LAWS OF THE SOCIETY, lxviii
Germination Capacity of Seeds, 47
Grass Seeds, 62
Gutter Plough, the, 97
- HARVESTING MACHINERY, 105
Haymaking, 108
"Horse, the Great," 258
- IMPLEMENTS, J. Darby on Evolution of, 95
— at Cardiff, 221
In Memoriam, the Rt. Hon. Sir T. D. Acland, Bart., 1
"Insects Injurious to Fruits," 254
Ireland, Co-operation in, 84
"JERSEY CATTLE," 255
- KAINIT on Grass-land, 187
- LIME ON GRASS-LAND, 185
Lining, an Experiment on, 144
Live Stock, Feeding of, 253
Lloyd-Baker, G. E., on Farm Schools, 88
Lloyd, F. J., on Cheddar Cheese-Making, 142
—, on the Manufacture of Cider, 203
Lucerne, 239
— seeds, 59
—, value of, 253
- McCREATH, JAS., on Dairying in Cornwall, 117
Machinery in past Sixty Years, 95
Mangel Seeds, 61
Mangold Disease, 134
"Manuring of Market-Garden Crops," 257
— of Oats, 247
Mathews, Ernest, on Butter Test Classes, 222
Members, List of, cxxix
Milk, Acidity of, 145, 159
—, Composition of, 145
— of individual Cows, 151
— Records of Cornish Dairy Cows, 119
— Test at Cardiff, 222
Mistletoe, 131
Mustard Seed, 54
"Mycology, Technical," 251
- NIPPLEWORT, 56
Normandy, Farm Schools in, 88
- OATS, the Manuring of, 247
Objects of the Society, lxvi
Officers of the Society, lxxi
Orchard Fruits, Insects injurious to, 254
Orchards of Normandy, 91
- PARSNIP, 61
Percival, Prof. John, on Farm Seeds, 44
Permanent Pasture, Experiments on, 174
Plantain Seeds, 56
Plant Foes of Farmer, by Wm. Caruthers, 128
Plants and Bacteria, 172
Plough, Chilled Digging, 97
—, the Three Furrow Gang, 96
Plowman, T. F., on late Sir T. D. Acland, Bart., 1
— on Society's Exhibition at Cardiff, 217
— on Society's Schools, 136
Portable Steam Engines, 99
Potato Diggers, 109
— Disease, Fungus, 134
— Planters, 105
Poultry Prizes, 1899 . . cviii
Preservatives in Cider, 210
— in Food, 259
Privileges of Membership, lxvi
Prize Awards, 1898 . . iii
Prizes at Cardiff, 220
Prizes, 1899 . . lxxv
- RACE HORSES, Deterioration of, 259
Rainfall in 1898 . . 204
Raw Bone-Meal on Grass-land, 184

- t of Council, 218
 R. Henry, on Advantages of
 operation, 71
 t Poor Land, 237
 Scrapings on Grass-land, 184
 tham, F. J., on Society's Experi-
 ts on Pasture, 174
 of Wheat, 134
 Grass Seeds, 69
- IN, 60
 a Grass-land, 188
 es, How to Take for Analysis,
 tii
 Outbreaks of in Sheep, 27
 s, Propagation of, 31
 Temperatures, 162
 t, the, of 1898 .. 203
 Purchasing, 52
 Testing Germinating Power of,
 e, Effect of in Cheese-Making,
 , Good and Bad Points of, 234
 Scab, by Prof. Wortley Axe, 25
 —, Curative Measures, 35
 —, Varieties of, 28
- Sheep-Shearing Machines, 114
 Shoeing Competitions, 140
 Small Cider, 209
 Spongy Curd, 170
 Spraying Machines, 115
 — to Destroy Charlock, 243
 Stephens, Julian, on Butter Test
 Classes, 222
 Sterilised Milk, 231
 "Story of the Farm," 256
 Subscriptions, cxxix
 Sunshine in 1898 .. 204
 Superphosphate on Grass-land, 188
- THISTLE MILKING-MACHINE, 114
 Thrashing-Machines, 99
 Timothy Grass, 65
 Turnip Seeds, 54
- VINEGAR TAINT IN CHEESE, 169
 Voelcker, Dr. J. A., Annual Report,
 216
 — —, on Milk Test Classes, 222
- WEEDS, 129, 178
 Whey, Fat in, 162
 Winter Feeding, 120

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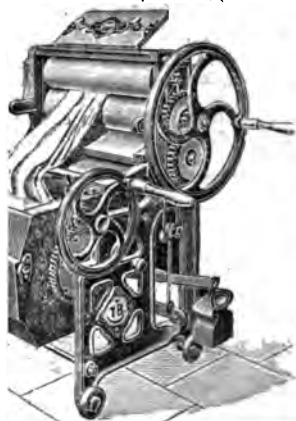
the flesh being of close solid texture and of deep orange colour, such as is found in best Scotch-Yellow Turnips, which these new kinds are destined to supersede on account of the liability of the older sorts to be destroyed by the *Plasmodiophora Brassicae* fungus, now so prevalent in many parts of Great Britain and Ireland.

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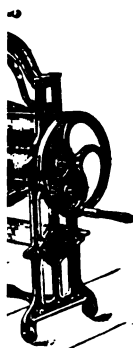


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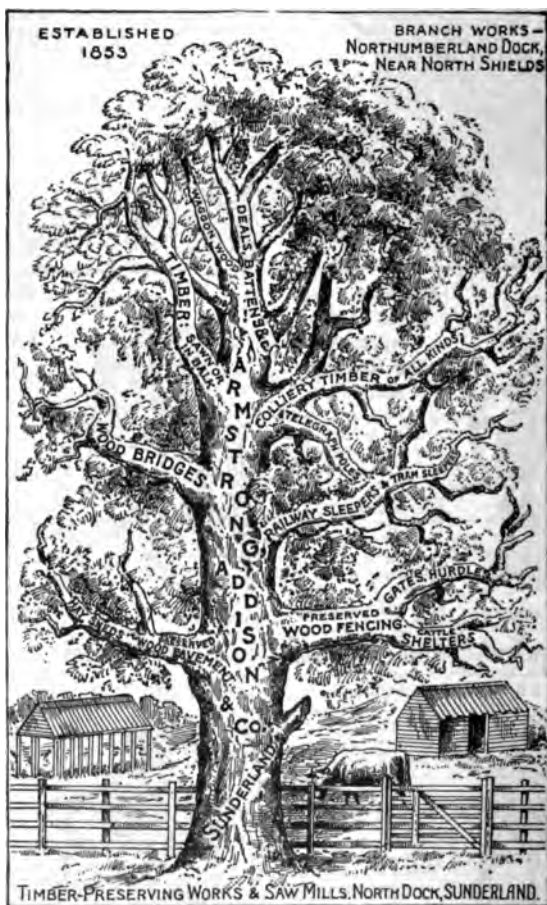
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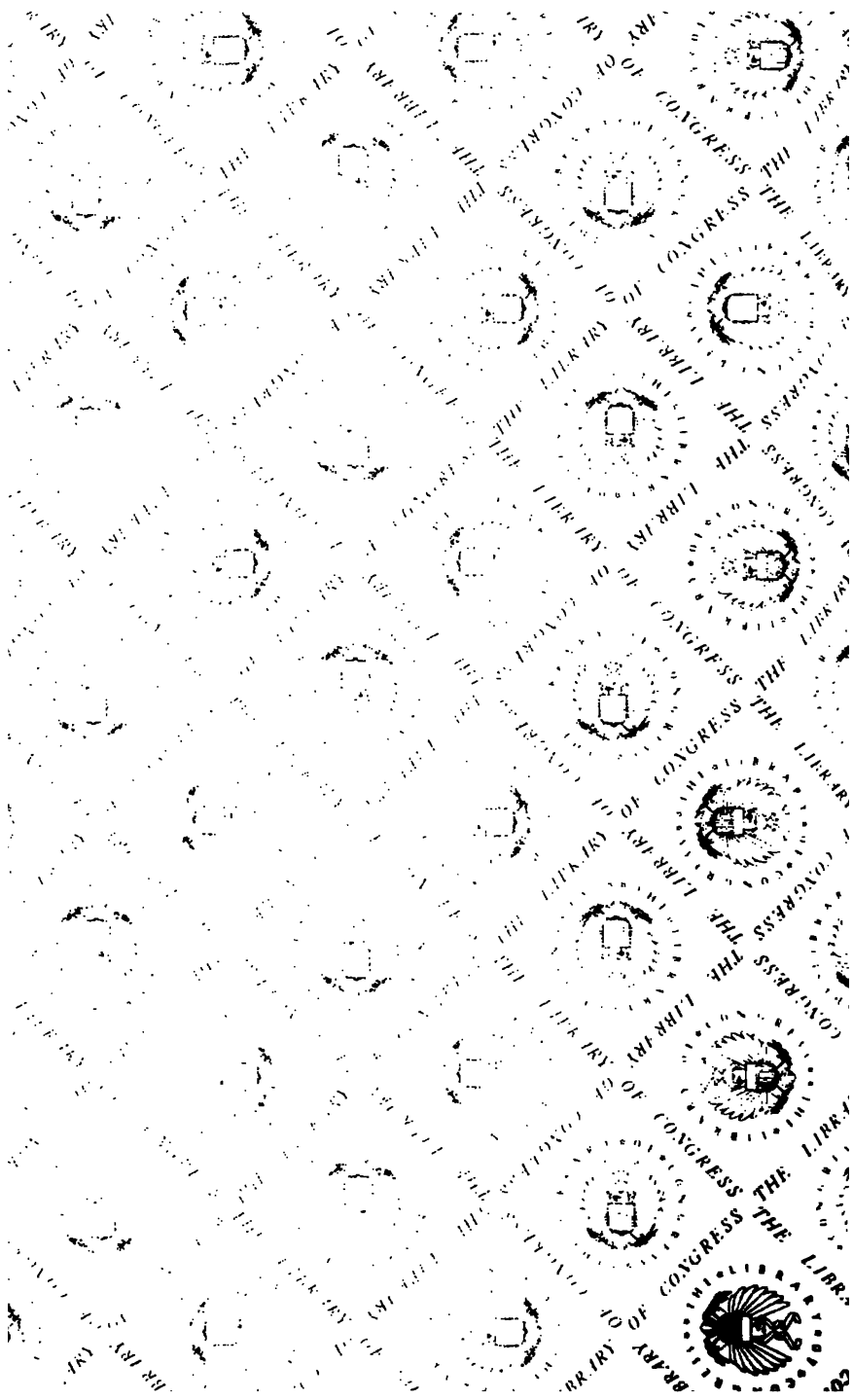
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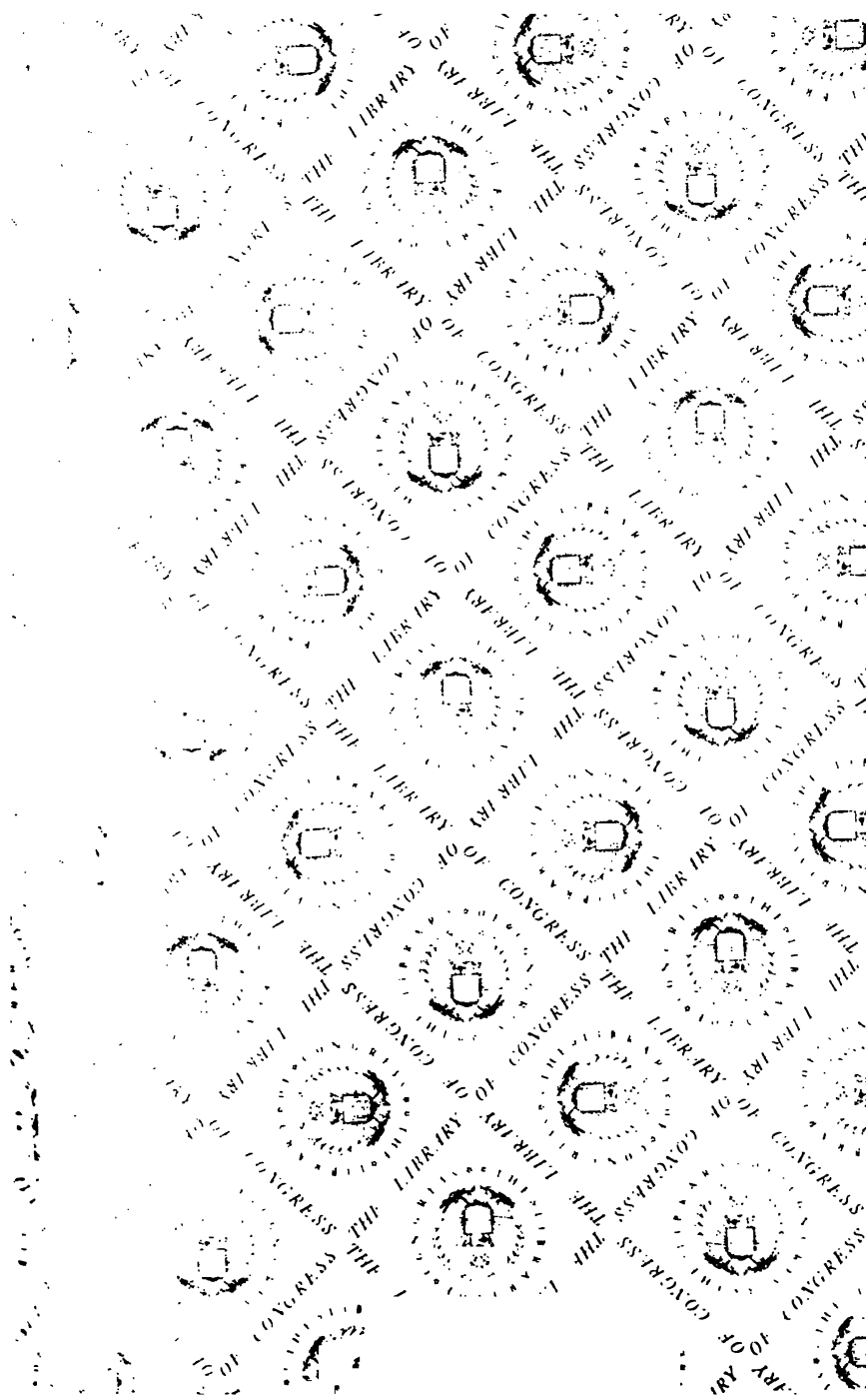
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